October 21, 1957

Paper Trade Journal

Starch Use at Wet End — Which form of starch to use for each application and when and where it should be applied

Sulphite Digester Linings — Use of brick linings is reviewed and latest developments are presented by the leading expert on this subject

Grinder Pulp Stones — A comparison of pulp stone types with a discussion of sharpening methods and best operating procedures

University Microfilms
Att: E B Power
313 N First St.
Ann Arbor, Mich.

Look at the Pulp Record. You'll see why so many of our customers have been with us so long, some over 40 years. They know the vital importance of supplies from outstanding sources, in Bleached and Unbleached Sulphite, Bleached Hardwood, Groundwood, Bleached, Semi-Bleached and Unbleached Kraft. They have the assurance of excellent service developed by over 70 years of experience. Contact us today.

THE GOTTESMAN ORGANIZATION

Established 1886

WOOD PULP G

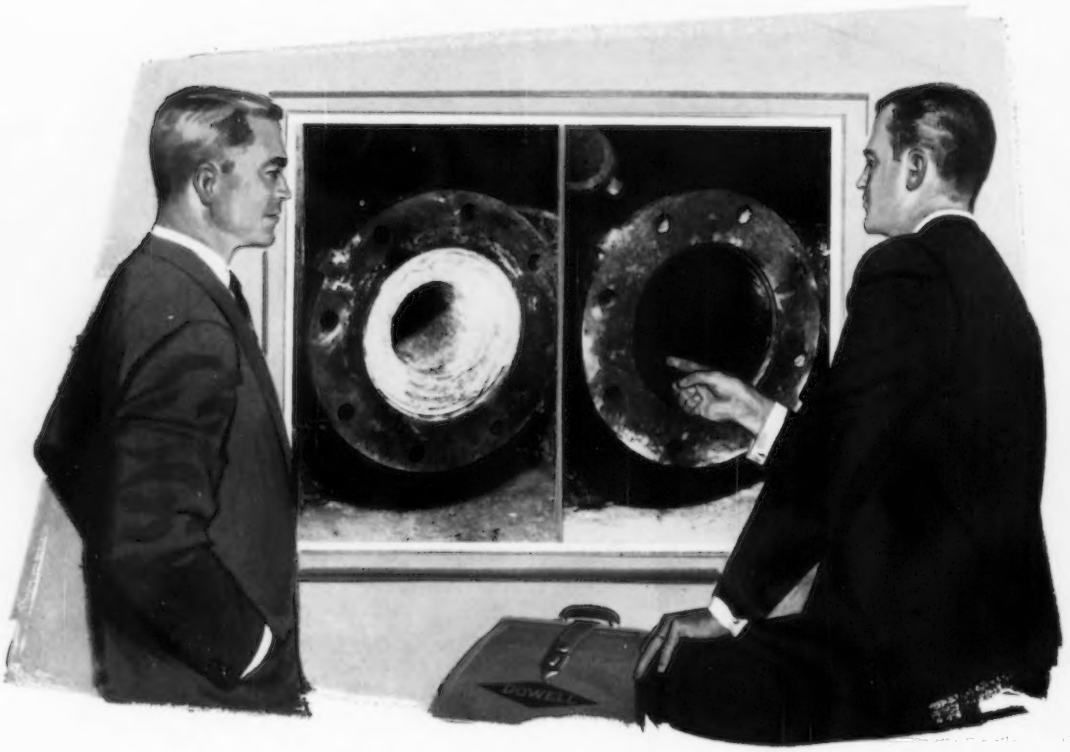
Gottesman & Company, Inc. Central National Corporation
Central National Commercial Company, Inc.
100 Park Avenue, New York 17, N. Y.

Gottesman & Company Aktiebolag, Stockholm, Sweden
Central National-Gottesman Limited, London, England

Representatives in 55 Leading World Markets

PULP PAPER EXPORT CNC

here's how Dowell chemical cleaning saved $71,000 and helped protect a plant profit!



A few months before their peak season, the operators of this plant decided their main water line might not supply the water necessary to meet peak demands. The line was cast-iron, 16-inches in diameter and over 7,000 feet long. Its original flow efficiency or "C" factor had been 105; scale build-up had reduced this to 72. To lay an auxiliary line would cost at least $85,000.

Dowell contracted to clean the pipe chemically for a little less than $14,000, and to restore a minimum of 50 per cent of the line's lost capacity.

This Dowell did, and more—increasing the "C" factor to 92! Enough water was immediately available for capacity operation. This saved the plant $71,000 and helped protect the company's annual profit.

The operating credit realized by this food processing plant, as a result of Dowell service, is similar to those realized by other Dowell customers—in the steel, paper, chemical, oil refining, power and allied industries.

Dowell engineers are experts in the use of solvents to remove scale and sludge—deposits that cut the throughput of product, process and steam generating systems. Dowell does the job, furnishing all chemicals, trained personnel, pumping and control equipment.

For specific information on how chemical cleaning can help you to greater profits, call the Dowell office nearest you. Or write Dowell Incorporated, Tulsa 1, Oklahoma.

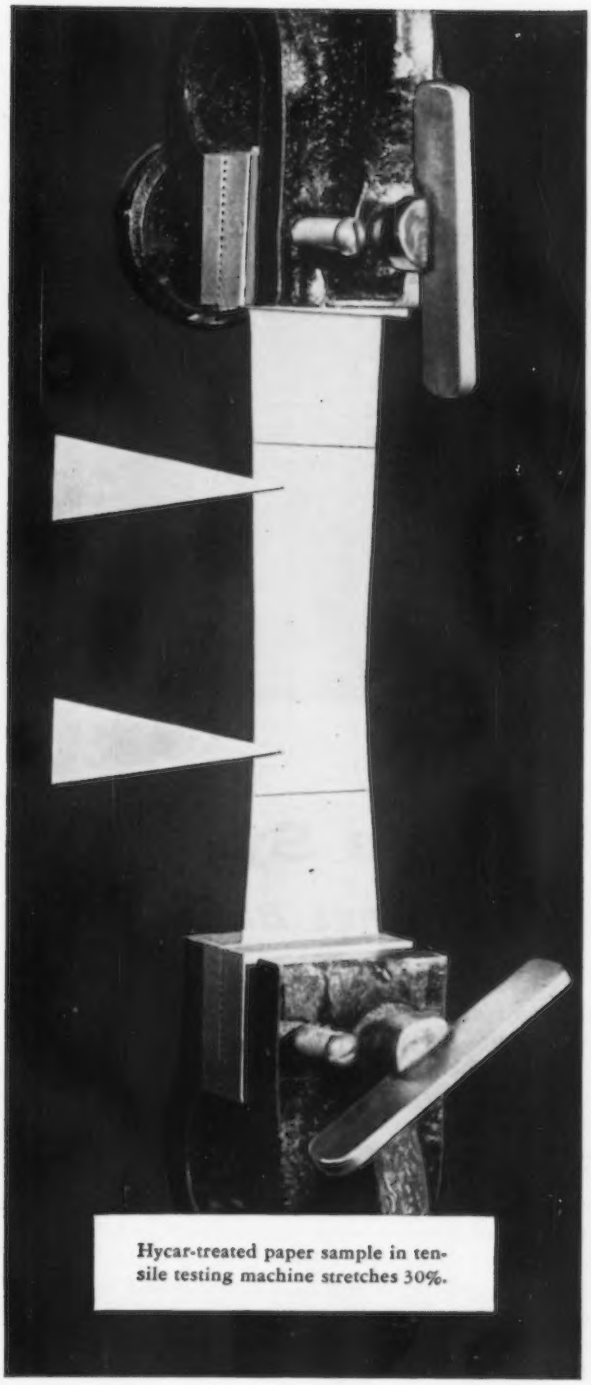
Have Dowell clean it chemically

DOWELL

A SERVICE SUBSIDIARY OF THE DOW CHEMICAL COMPANY

News about

B.F.Goodrich Chemical *raw materials*



Hycar-treated paper sample in tensile testing machine stretches 30%.

Hycar-treated paper stretches thirty percent

MANY special purpose papers require greater elongation properties. Masking tape stock is a good case in point. Here the paper must have the internal bond to resist de-lamination, plus good elongation. The photograph shows how saturating the base stock paper with Hycar latex builds in the necessary "stretch".

But vastly improved elongation characteristics are only one advantage that this material lends to paper. Hycar also improves tensile and tear strength, wet and dry burst strength, and oil, water and solvent resistance.

Another big job this versatile material does in the paper field is with the wax coated packaging papers. Used as a coating, Hycar resists penetration of the oil and glycol-based inks required for printing food wrappers. Here, Hycar means less ink used, brighter colors—plus increased abrasion resistance, greater strength and flexibility. These attributes add up to making food packages far better salesmen!

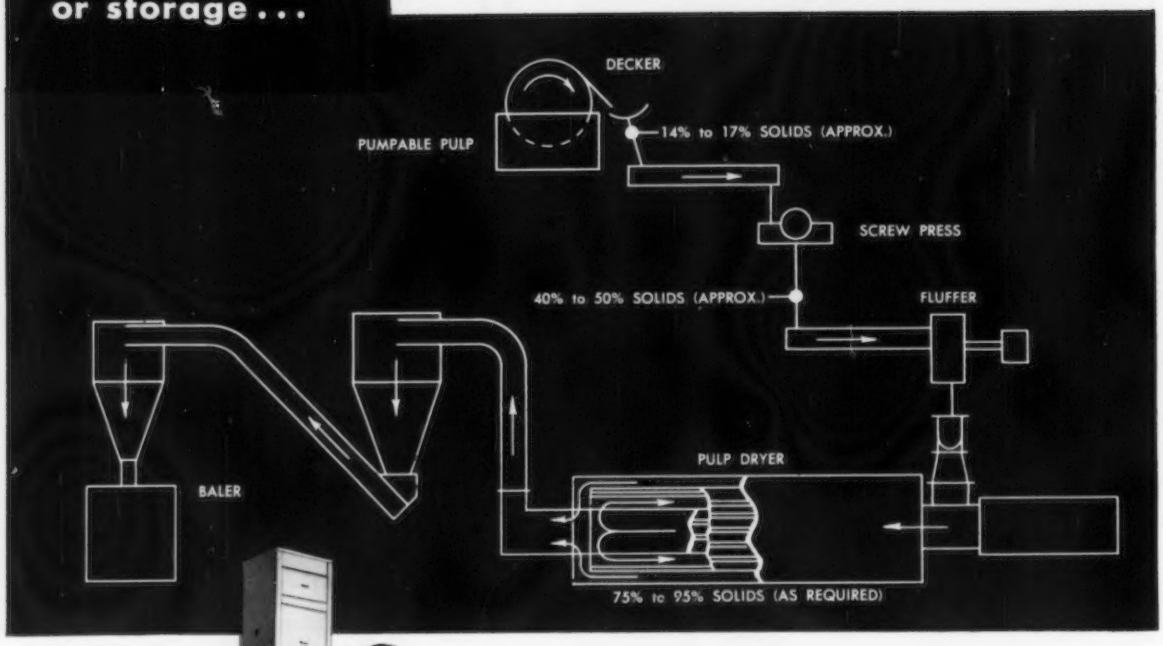
As you can see, the applications and advantages of Hycar latices are many and varied. Undoubtedly there's a type available that can add greater sales punch to your product. For further information write Dept. HQ-11, B. F. Goodrich Chemical Company, 3135 Euclid Avenue, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.

Hycar
Reg. U.S. Pat. Off.
American Latex

B.F.Goodrich Chemical Company
a division of The B.F.Goodrich Company

B.F.Goodrich GEON polyvinyl materials • HYCAR American rubber and latex • GOOD-RITE chemicals and plasticizers • HARMON colors

The NEW way to prepare pulp for shipment or storage...



Bauer-Bale System

Using the Lummus Baling Press

This special Lummus high density baling press streamlines handling of pulp prepared for shipment or storage by the new Bauer-Bale system, developed by The Bauer Bros. Co.

It is a continuously operating, two-station hydraulic press. Over 1,300,000 pounds compresses the dried pulp into 2′ x 2′ x 4′ bales weighing about 700 pounds, at the rate of one every four or five minutes. Automatically regulated, bale density is 45 to 65 pounds per cubic foot, meeting all loading requirements.

The compact bales will withstand rough treatment and can be shipped with or without straps or protective wrapping. Uniform in size, shape and weight, the highly compressed bales can be moved easily with hand dollies, fork lifts or conveyors. The time and labor savings provided by this Lummus press make it an economical asset to the Bauer-Bale system.

For the descriptive bulletin on the Bauer-Bale system, write to The Bauer Bros. Co., Dept. L, Springfield, Ohio.

Lummus Cotton Gin Co.
Columbus, Georgia

Published every Monday by Lockwood Trade Journal Co., Inc., 49 West 45th Street, New York 36

Phone: PLaza 7-2370

PAPER TRADE JOURNAL

Published Weekly Since 1872

October 21, 1957, *Vol. 141, No. 42*

JOHN C. W. EVANS
Editor

PAUL D. VAN DERVEER
Associate Editor

R. E. THUEMMES
Associate Editor

J. A. BROPHY
Managing Editor

ERNEST F. BARKER
Field Editor

LOCKWOOD TRADE JOURNAL CO., INC.

GEORGE E. LOCKWOOD.....President and Treasurer

ARTHUR E. GORDON.....Vice-President

FREDERICK E. WINKLER.....Secretary

TRENDS 13

NEWS BRIEFS

Mead Corp. to Purchase Hurlbut 17

W. Va. Acquires Virginia Folding Box 17

Longview Fibre Starts Largest Recovery Unit 17

FEATURE ARTICLES

Addition of Corn Starch at the Wet End Requires Study of Many Factors 22

Modern Sulphite Digester Linings — Recent Technical Developments 25

Maintenance Tips for Unit Heaters 30

How, What, Where and Why of Pulp Stones 35

How to Take Care of Rubber Rolls 43

NEW LITERATURE 34
NEWS OF CONVERTERS 42
NEW EQUIPMENT 45
FIGURES OF THE WEEK 46
PRICES OF MATERIALS 46
PAPER PEOPLE 47
NEWS OF ASSOCIATIONS 48
PRICES OF FIBERS 54
NEWS OF SUPPLIERS .. 58
OBITUARIES 60
CLASSIFIED ADVERTISING 64
ADVERTISERS INDEX .. 70

Entered as Second Class Matter at the post office at East Stroudsburg, Pa., under Act of Congress of March 3, 1879. Publication Office at Lockwood Trade Journal Co., Inc., 34 North Crystal St., East Stroudsburg, Pa. Printed in U.S.A. Copyright 1957 by Lockwood Trade Journal Co., Inc. **Paper** established Feb. 17, 1899, combined with **Paper Trade Journal** Nov. 16, 1899. **Paper** established Sept. 21, 1910, combined with **Paper Trade Journal** February 19, 1926. All rights to the above titles reserved. Contents of **Paper Trade Journal**, including all articles, illustrations, etc., are copyrighted and may not be reprinted except by permission. Also publishers of **Lockwood's Annual Directory of the Paper and Allied Trades.**

SUBSCRIPTIONS

United States	1 yr.	2 yrs.	3 yrs.
Paper and Pulp Mills, Converters, and Personnel ..	$5.00	$8.00	$10.00
All others	7.50		
U. S. Possessions and Canada..	7.00	11.00	14.00
Latin American Countries	15.00	25.00	30.00
All other Countries	20.00	30.00	40.00

Single copy price of current issues:
North America 50c
Foreign $1.00

R. E. BOETSCH
Circulation Director

REMEMBER THESE DATES . . .

OCT. 21-25: National Safety Congress at Conrad Hilton Hotel, Chicago, Ill.

OCT. 28-30: Packaging Institute 19th Annual Forum, Hotel Statler, New York, N. Y.

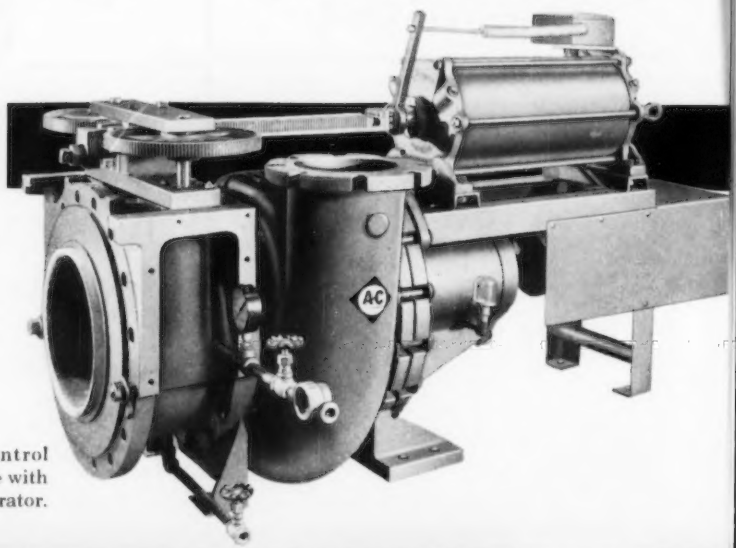
NOV. 6-8: Alkaline Pulping Conference at Francis Marion Hotel, Charleston, S. C.

NOV. 11-13: National Paperboard Assn. Annual Meeting at Waldorf-Astoria Hotel, New York City.

JAN. 29-31: Canadian Pulp & Paper Assn. Annual Meeting at Mount Royal Hotel, Montreal, Canada.

FEB. 17-22: Paper Week in New York.

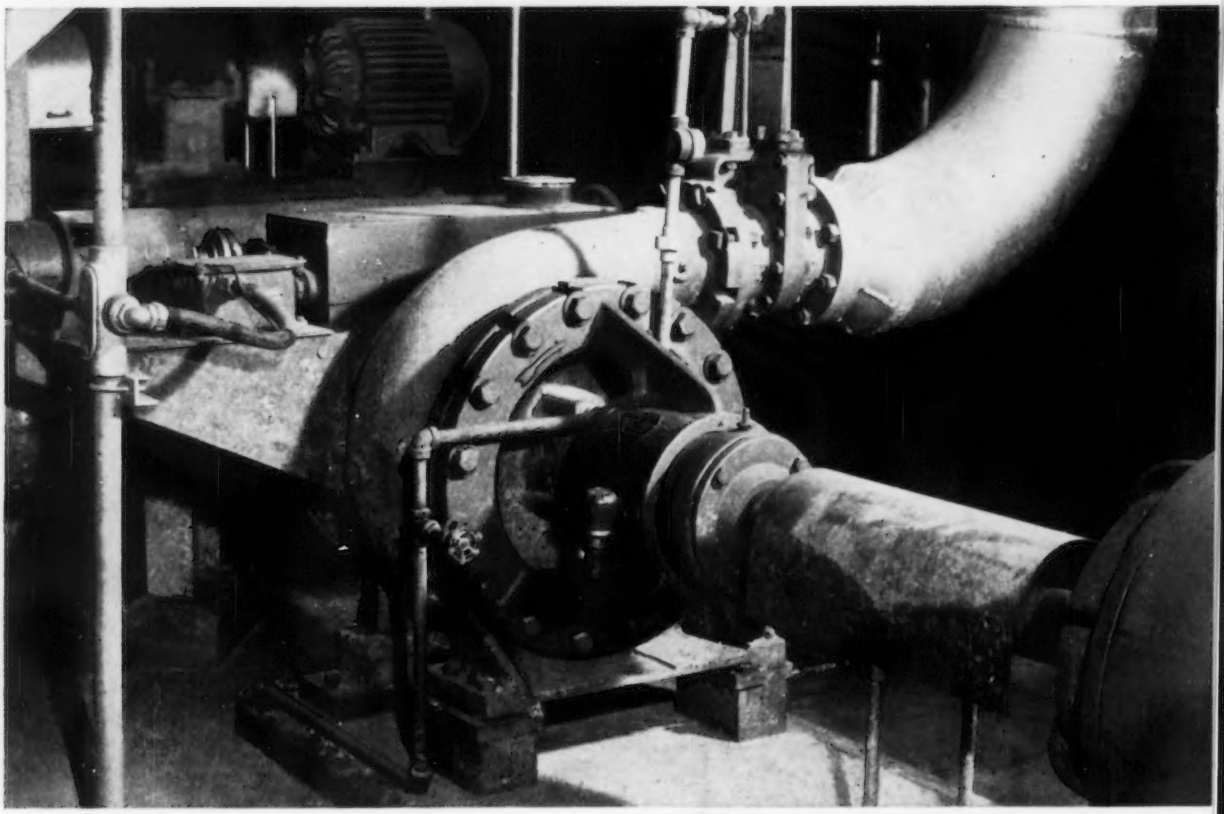
See what



ACAP Pump Operates at Any Point on Curve —

Internal by-pass cylinder moves toward or away from impeller. Cylinder at outer limit gives zero flow, maximum recirculation. Cylinder at inner limit gives maximum flow, minimum recirculation. An infinite number of intermediate settings between limits. All this without valves, and at considerable power savings. Up to 45,000 gpm, heads to 270 feet.

In addition to pneumatic control shown, *ACAP* pump is available with hydraulic, electric or manual operator.



ACAP pump moving 4% kraft stock to refiner, 600-800 gpm, 100-90 feet head.

A-C ALLIS-CHALMERS

A-5374

ALLIS-

you started

ACAP PUMP ...the latest in a long line of pumps for the Pulp and Paper Industry

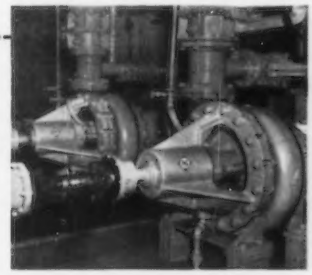
Your industry accepted the *ACAP* pump when we announced it about 3 years ago. It enables you to vary capacity or head automatically or manually . . . without changing pump speed.

The *ACAP* pump is the latest in a succession of pumps designed for your industry. It all started in 1926. That's when you first wanted a pump to handle stock up to 5% consistency. We designed it. You used it because it filled a specific need.

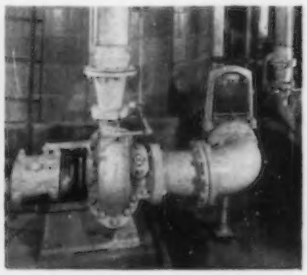
Today, pumps designed and built by Allis-Chalmers are in service in more than 50 types of pumping applications throughout the pulp and paper industry. Your continued confidence in our equipment—our continued efforts to design equipment to meet your requirements, have worked to mutual advantage. And you started it.

A Complete Line of Centrifugal Pumps

Wherever a pump is required in the mill, Allis-Chalmers offers a specific type for a specific job. There are pumps for solids in suspension and for clear liquids . . . pumps to meet any conditions of temperature, corrosion or abrasion . . . pumps to handle any capacity or head.



PW pump, single-stage, single-suction — up to 10,000 gpm, heads to 270 feet.



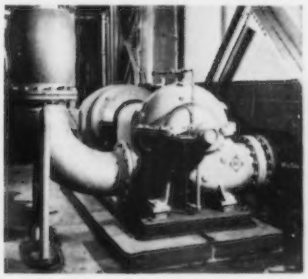
SSOR pump, single-stage, single-suction — up to 3000 gpm, heads to 225 feet.

A Complete Pumping Unit

Pump, motor, drive and control — all built by Allis-Chalmers — are available as a unit . . . ready to install and run. This saves you installation time and money — gives you all the benefits of "one source" responsibility.

For pump specifications, call your A-C representative or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.

PD pump, single-stage, single-suction — up to 1300 gpm, heads to 260 feet.

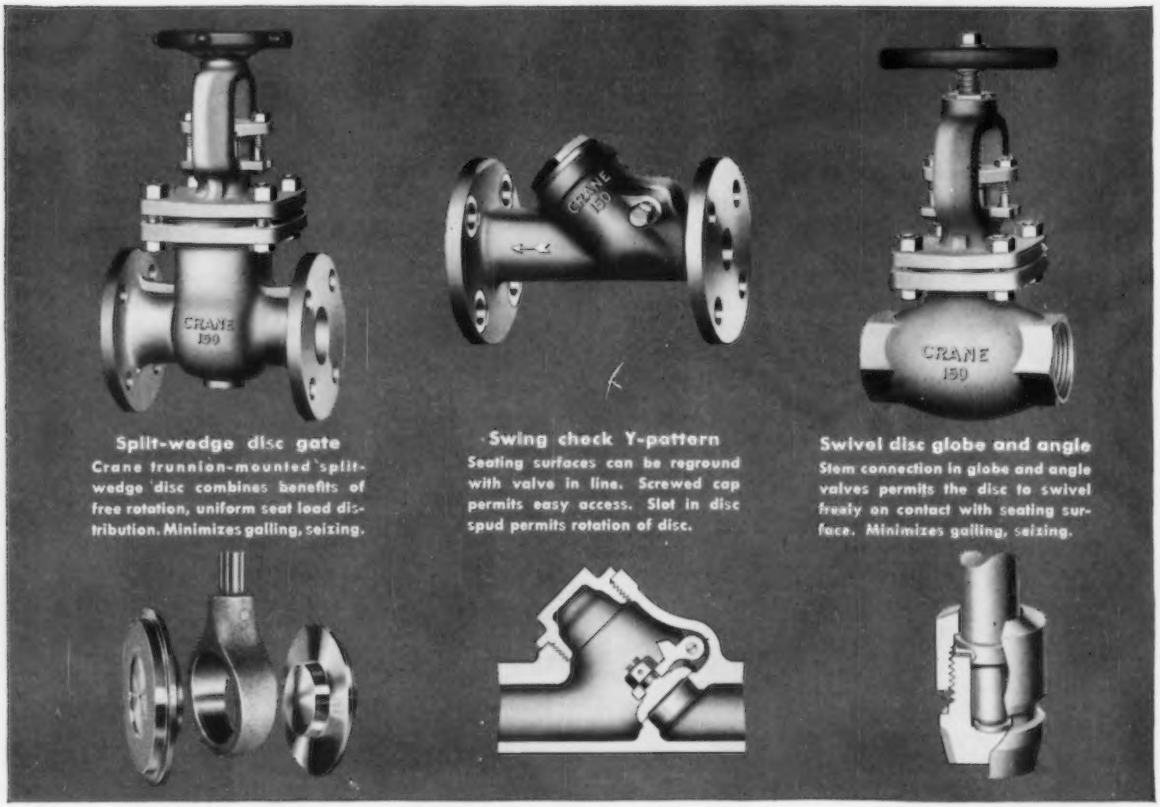


S pump, single-stage, double-suction — up to 260,000 gpm, heads to 600 feet.

CHALMERS

ACAP is an Allis-Chalmers trademark.

Cut your piping costs with CRANE corrosion-resistant valves



Split-wedge disc gate
Crane trunnion-mounted split-wedge disc combines benefits of free rotation, uniform seat load distribution. Minimizes galling, seizing.

Swing check Y-pattern
Seating surfaces can be reground with valve in line. Screwed cap permits easy access. Slot in disc spud permits rotation of disc.

Swivel disc globe and angle
Stem connection in globe and angle valves permits the disc to swivel freely on contact with seating surface. Minimizes galling, seizing.

Are your alloy valve replacement costs too high? Do you have trouble preventing product contamination?

Thousands of processors who must handle and control the flow of corrosive fluids in production have solved these problems effectively with Crane alloy valves—18-8 SMo stainless steel and Craneloy 20.

These valves, in addition to providing high resistance to corrosion and protection from product contamination, also have construction and operating features that are unequaled in cutting maintenance and installation costs.

For complete information about Crane alloy valves for processing industries—application recommendations, materials, sizes, ends available, and companion fittings—write to the address below, or ask your Crane Representative.

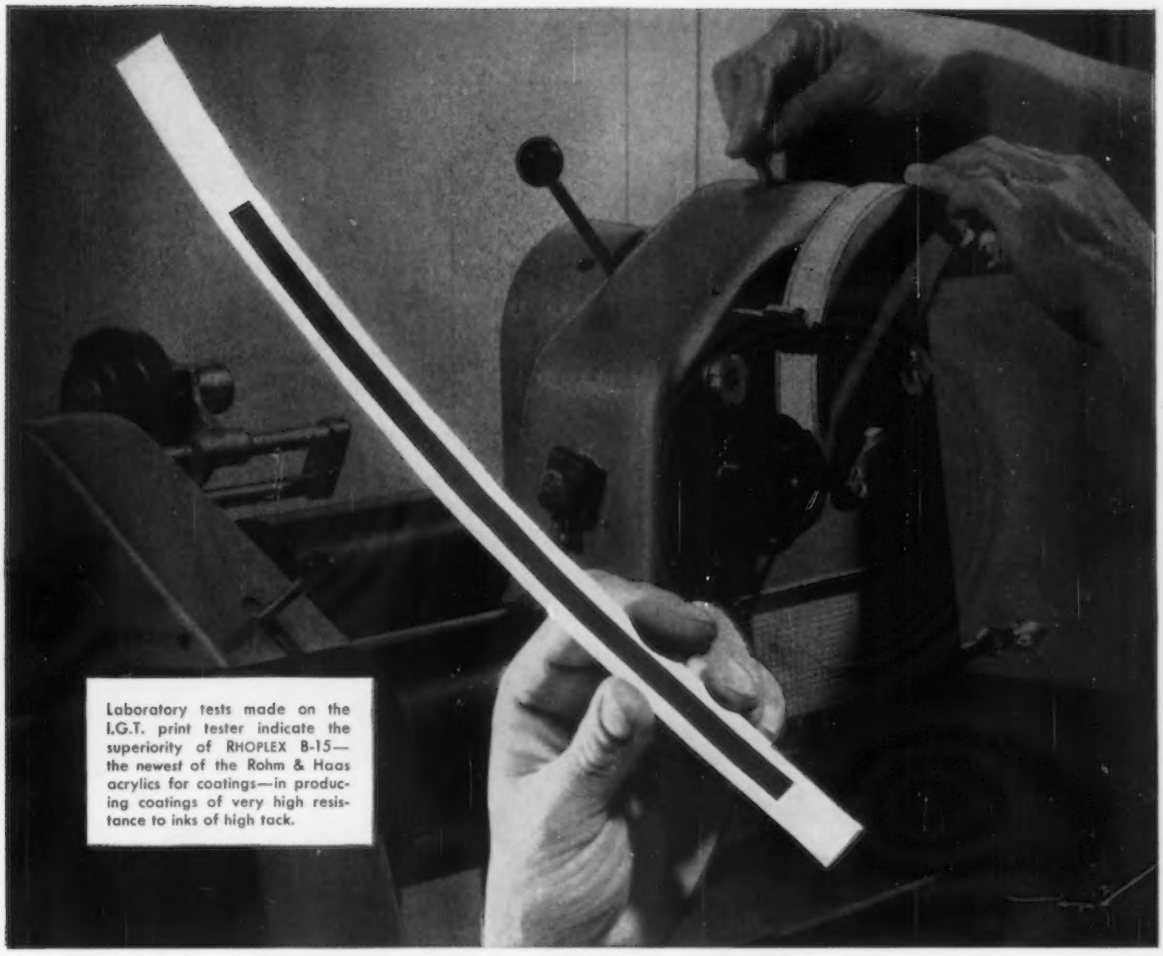
Send for Circular 2080 today.

CRANE VALVES & FITTINGS

PIPE • PLUMBING • KITCHENS • HEATING • AIR CONDITIONING

Since 1855—Crane Co., General Offices: Chicago 5, Ill. Branches and Wholesalers Serving All Areas

IMPROVE the printing quality of your coatings with new **RHOPLEX** *acrylic* emulsions



Laboratory tests made on the I.G.T. print tester indicate the superiority of RHOPLEX B-15—the newest of the Rohm & Haas acrylics for coatings—in producing coatings of very high resistance to inks of high tack.

New RHOPLEX acrylic emulsions are doing wonders for the printing quality of coated paper and paperboard. Coatings containing RHOPLEX accept fine-line reproduction *at high speed* in full, true ink colors. They have improved ink receptivity, together with greater ink hold-out. They withstand printing with high-tack, multicolor inks without picking.

The thermoplastic nature of RHOPLEX acrylic binders permits coatings to be finished to a level of gloss and smoothness *beyond that of protein systems*. The low viscosity of RHOPLEX coatings at high solids provides excellent coverage. Other inherent properties of RHOPLEX acrylic binders include: permanent flexibility, exceptional mechanical and chemical stability, freedom from odor, and good resistance to water. Write today for full details on RHOPLEX acrylic binders and for recommended coating formulations.

RHOPLEX is a trade-mark, Reg. U. S. Pat. Off. and in principal foreign countries.

Chemicals for Industry

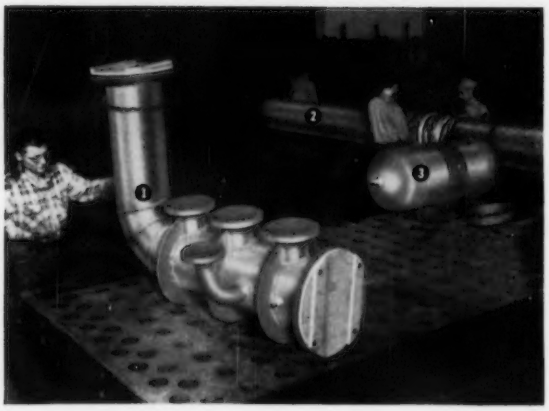
ROHM & HAAS COMPANY

THE RESINOUS PRODUCTS DIVISION

Washington Square, Philadelphia 5, Pa.

Representatives in principal foreign countries

ALL IN A DAY'S WORK at *Pittsburgh Piping*



These three jobs are typical of the wide variety of custom piping work which we do for the power and process industries. In the background of the photo welders are shown making the heli-arc root pass on 18" O.D., 3.875" wall, chrome-moly main steam piping. In the foreground, ready for final inspection, is a 12" header for a process operation, fabricated of ⅜" aluminum alloy. The pressure vessel, of austenitic steel, is one of many we produce for atomic energy application. The manufacturing of this type of piping requires specialized facilities . . . for engineering, fabricating, testing, assembly, and erection. We have those facilities. Use them on your piping jobs.

Promoting Progress ***IN POWER AND PROCESS PIPING***

Pittsburgh Piping **AND EQUIPMENT COMPANY**
158 49th Street—Pittsburgh, Pa.

Canada: **CANADIAN PITTSBURGH PIPING, LTD.,** 835 BEACH ROAD—HAMILTON, ONTARIO

Atlanta	*Whitehead Building*	*Hollywood*	*1828 North Alexandria Ave.*
Boston	*10 High Street*	*New Orleans*	*P. O. Box 74*
Chicago	*Peoples Gas Building*	*New York*	*Woolworth Building*
Cleveland	*Public Square Building*	*Syracuse*	*113 So. Salina Street*
		Toronto	*68 Yonge Street*

The fine detail of the boy contrasted with the out-of-focus background requires faithful reproduction — reproduction your customers can be sure of on papers processed with Glidden Alpha Protein.

Special Reproduction...

SHOWN ON PAPER PROCESSED WITH GLIDDEN ALPHA® PROTEIN

Leading manufacturers of high-grade printing paper use Glidden *Alpha Protein* as a coating adhesive to provide a smooth surface for detailed reproduction of fine halftones. Reason — controlled uniformity, cleanliness and production advantages help them improve their product and reduce production costs.

FOR OFF-MACHINE COATING—*Alpha Protein* is compatible with the various mineral substances in the coating and binds them firmly to the base stock. *Alpha Protein* coating dries rapidly, and gives excellent finish on calendering.

FOR ON-MACHINE, HIGH SOLIDS COATING—*Alpha Protein* helps to improve opacity and whiteness, and makes possible smoother, more uniform paper. Extra solids in *Alpha Protein* coatings result in production increases up to 15%. More solids mean less drying time — higher machine speeds — higher coat weights. *Alpha Protein* machine-coated papers are currently being produced that are comparable in quality to costlier conversion-coated papers.

The knowledge, skill and pilot-testing equipment of Glidden Technical Service have helped many manufacturers improve quality, reduce costs and speed production with *Alpha Protein.* Call or write for details.

Glidden

CHEMURGY DIVISION

The Glidden Company

1825 N. Laramie Avenue • Chicago 39, Illinois

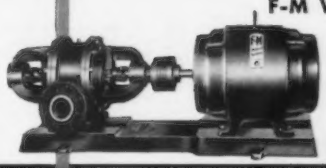
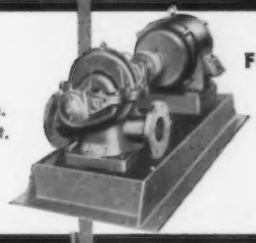
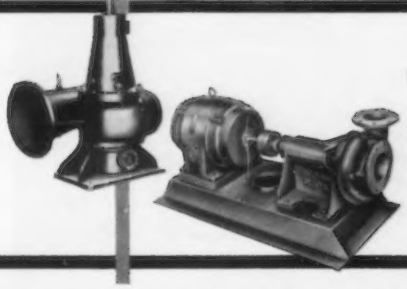
QUALITY Glidden PRODUCTS

★ LODDING DOCTORS ★

Modern **paper-makers use Lodding *modern* Calender Doctors**

LODDING ENGINEERING CORPORATION
WORCESTER, MASSACHUSETTS

Guide to better pump selection

for		specify
boiler feed condensate return hot and cold liquids chemicals refrigerants, etc.	up to 200 gpm. pressures to 900 ft.	 **F-M WESTCO PERIPHERAL PUMPS** High pressure at normal operating speeds. Handle widely varying heads with little change in capacity. Sizes 1¼" through 2½".
hot and cold liquids liquid circulation nonviscous liquids boiler feed cooling towers, etc.	up to 900 gpm. pressures to 525 ft.	**F-M BUILTOGETHER CENTRIFUGAL PUMPS** General-purpose, close-coupled pump and motor units mount in any position—horizontal, vertical or angular. Sizes ¾" through 5".
sewage slurries paper stock fruit shrimp vegetables, etc.	up to 30,000 gpm. pressures to 175 ft.	**F-M NON-CLOG PUMPS** Unexcelled for clog-free handling of liquids with solids in suspension. Sizes 2" through 20". Vertical or horizontal. Bladeless or conventional.
water supply plant service booster circulating air conditioning refrigeration chemical liquids boiler feeds, etc.	up to 50,000 gpm. pressures to 700 ft.	 **F-M SPLIT-CASE CENTRIFUGAL PUMPS** High, sustained efficiency over wide range of conditions. Low-cost maintenance. Sizes 1½" through 36". Single stage or multistage.
hot and cold liquids chemicals circulating liquids nonviscous liquids cooling towers condenser circulation, etc.	up to 100,000 gpm. pressures to 250 ft.	 **F-M END-SUCTION PUMPS** A wide line of rugged, precision-built pumps. Sizes ¾" through 54". Horizontal or vertical centrifugal.

***FOR* LOW-COST PUMPING *SPECIFY* FAIRBANKS-MORSE**

Need new pumps? Your Fairbanks-Morse Dealer has the world's greatest variety for you to choose from. Need help in selection? Your F-M Dealer and F-M Sales Engineer will help specify the right type, right size pump and driver for low-cost foolproof operation. Call them today, or write Fairbanks, Morse & Co., Dept. PTJ-1021, 600 So. Michigan Ave., Chicago 5, Illinois.

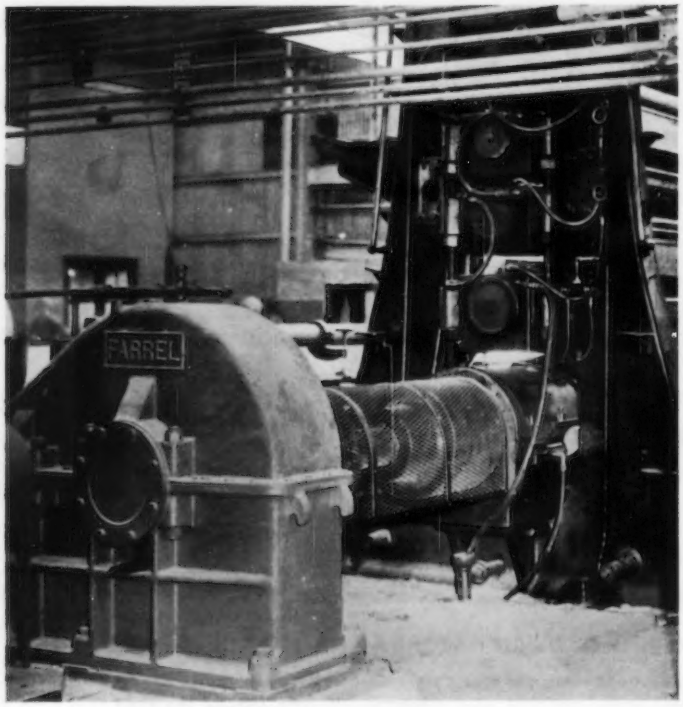
FAIRBANKS-MORSE

a name worth remembering when you want the BEST

PUMPS • SCALES • DIESEL LOCOMOTIVES AND ENGINES • ELECTRICAL MACHINERY • RAIL CARS • HOME WATER SERVICE EQUIPMENT • MAGNETOS

ERE'S WHY FARREL® SPEED REDUCERS CAN SOLVE YOUR DRIVE PROBLEMS...

There are 35 Farrel speed reducers in this mill.



This is one of 80 Farrel units installed in a southern mill.

Unlike most "standardized" products, Farrel speed reducers are standard only in their principal features. They are adaptable in critical detail.

The gears and pinions can be proportioned to meet specific load, speed and service requirements. Input and output shafts can be varied in size, in material, and in extension. Even some housing dimensions can be modified to meet problems in mounting.

This design flexibility has resulted in the solution of innumerable application problems. There is no need to compromise. You can ask for—and get—a unit that will meet your exact needs.

Mills throughout the country have "discovered" this unique feature of Farrel speed reducers. That is why so many of these units can be found transmitting power to suction presses, smoothing presses, dryers, couches, calenders, reels and other equipment in modern mills.

Write for further details of these problem-solving units. Ask for a copy of Bulletin 450.

FARREL-BIRMINGHAM COMPANY, INC.
ANSONIA, CONNECTICUT

Plants: Ansonia and Derby, Conn., Buffalo and Rochester, N. Y.
Sales Offices: Ansonia, Buffalo, Boston, Akron, Chicago, Minneapolis, Fayetteville (N. C.), Los Angeles, Salt Lake City, Tulsa, Houston.

Farrel-Birmingham®

FB-1117

August Board Up Paper Down

Paper and board production during August amounted to 2,678,221 tons. This was 2% below the 2,738,745 tons produced in August a year ago. These figures are from the U. S. Dept. of Commerce report on our industry for August, which gives the first detailed figures on August production. Paper production amounted to 1,153,451 tons, which was 5% below the 1,210,965 tons produced in August of last year. The output of paperboard during this month was 1,244,537 tons reflecting a slight increase over the production of 1,241,367 reported for August 1956.

Board Remains Ahead of Paper

Paperboard activity in the first week of October continued to outstrip paper. Paper mills ran at 92% of capacity and board mills at 97%.

Over-Production Excess Eased

The danger of excessive over-production has been eased during the past year according to a statement by David L. Luke, president of A.P.P.A. and West Virginia Pulp & Paper Co. in a statement reported in this issue (See page 20). Mr. Luke said that about five million tons of projected increases in annual paper and paperboard producing capacity had been postponed or abandoned in the past year. He said that while we do have some excess capacity, which situation will probably continue until 1960, this will not be of an unmanageable size if the economy remains at its present level and is typical of an aggressive and competitive industry.

Canadians Happy U. S. Board Up

Canadian board mills are reported to be very pleased about the increased demand for paperboard in this country, not because they hope to sell in this market but rather because U. S. mills with surplus capacity and the advantages of the Canadian dollar premium have been shipping substantial quantities over the northern border and competing with the Canadian mills.

Machinery Imports and Exports Are Valuable

Pulp and paper machinery exports are of real benefit to our industry. As our suppliers prosper they are enabled to invest more in research and development from which ultimately we reap gains. Last year the value of such exports increased 28% over the previous year. Canada and Mexico are the best customers, absorbing more than 50%. Imports of machinery for our industry are also of value since they introduce new and competitive ideas. The value of last year's imports was up 100% over 1955. However the amount is so relatively small that it should not be of serious concern to our domestic suppliers. Imports represent only 4% of the value of the exports. The above figures are based on U. S. Dept. of Commerce report.

PRODUCTION NEWS
Final Edition
INSTALLED BEFORE U.S. ENTERED WORLD WAR II, STILL RUNNING 16 YEARS LATER WITHOUT INTERRUPTION
Deferiet, N.Y. 1956-
The Sandy Hill Selective

SANDY HILL
SELECTIVE DRIVE

The Sandy Hill Selective Drive pictured above was installed on a paper machine in the St. Regis Paper Company's Deferiet, N. Y. mill in 1940. Today, *it is still running*, efficiently, economically, with never a shutdown due to structural or functional failure.

Since installation, there has been no detectable slippage. The original belts are still in use! And other Sandy Hill Selective Drives, quite naturally have been installed at this mill since.

You can add tons to *your* paper production with the kind of drive that *stays on the job*, with a minimum of attention . . . . smooth, efficient, profitable. Write today for full information on the Sandy Hill Selective Drive.

- ***Unvarying draw between sections***
- ***Fineness of draw regulation***
- ***Simplicity of design for easy maintenance***
- ***V-belt design eliminates slippage***
- ***Space saving — no basement or mezzanine needed for line shaft***

THE
SANDY HILL
IRON AND BRASS WORKS
HUDSON FALLS, N. Y.

What we think about

CHLORINE DIOXIDE BLEACHING

First, to be quite frank, we think it is your business and yours alone to decide whether chlorine dioxide is the best bleaching agent for your paper products.

Second, it is again your business and yours alone to decide which among the half-a-dozen generating methods is most economical for your bleaching.

When you have made these two basic decisions, we can be of help four ways:

One. Both in the East and in the South we can provide the fastest sodium chlorate service available.

Our Niagara Falls plant is the largest producer of sodium chlorate in the country.

Our Columbus, Mississippi plant is now expanding its production facilities by 5,000 tons a year after just completing expansion by the same tonnage last year.

Two. We can give you skilled technical help whenever you need it, *regardless of the process you use.*

Three. We can give you a uniform and pure product—99.5% pure at minimum.

Four. We can give you all around bleaching service and the understanding of your problems that can come only as the result of more than fifty years of experience serving the pulp and paper industry.

If you are contemplating the installation of a chlorine dioxide bleaching unit (or have one in service), and if this program makes sense to you, we will be interested in hearing from you. Perhaps we can help.

New Manual on Pulp Bleaching

Chlorine dioxide bleaching is just one of 11 subjects covered in this new 60-page Hooker manual on pulp bleaching. Flow charts, price and process comparisons, equipment specifications, handling methods, and references to the technical literature. Send this coupon for a copy.

Name.....

Title.....

Company.....

Address.....

City..... Zone.....

State.....

HOOKER CHEMICALS PLASTICS

HOOKER ELECTROCHEMICAL COMPANY

1810 Forty-seventh St., Niagara Falls, N. Y.

NIAGARA FALLS • TACOMA • MONTAGUE, MICH. • NEW YORK • CHICAGO • LOS ANGELES

CONTROLLED EMBOSSING

for paper, board, plastic, wallboard, flooring and luggage

Dilts HEAVY DUTY EMBOSSER*

Rigidity, correct alignment and even pressures are essential to quality embossing. The Dilts heavy duty embosser incorporates these main essentials in its rigid two-roll calender type construction—plus many other features that reflect sound engineering practice.

Rolls easily removed — merely take off cap bolts.

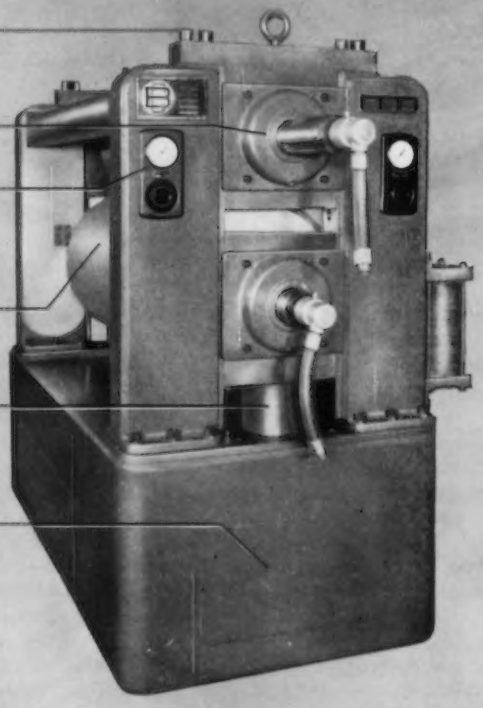
Heavy duty spherical roller bearings.

Desired loading pre-set on each side of machine with visual indications of loading pressure.

Steel to paper—steel to rubber or matched steel die rolls of correct diameter to suit job.

Rubber bumpers prevent gears from coming out of mesh—yet provide safety in case of wrap-up.

Air-hydraulic booster system for roll loading located in machine base—large access panels for easy servicing. Clean and compact.



Available in widths from 18" to 100"
Write for full details.

*Patented

The BLACK-CLAWSON Company

DILTS DIVISION • FULTON, N.Y.

Mead Corp. to Purchase Hurlbut

The Board of Directors of Mead Corp. and of Hurlbut Paper Co. have approved an agreement for purchase of the total assets of the Hurlbut Paper Co. by Mead.

Hurlbut Paper Co. has specialized in production of technical papers used by the plastics industry for decorative and industrial laminates, and in papers for many filtration purposes.

Hurlbut has pioneered in basic research in the paper industry and, has become one of the industry's foremost companies in the development of papers for the plastics, and of a wide range of papers using many synthetic organic and inorganic fibers. Hurlbut Paper Co., as a Mead subsidiary, will continue to operate under the same management and with the same production and sales policies.

Hurlbut has its office and plants at South Lee, Mass. It was started in 1806 and for many years was owned and operated by members of the Hurlbut family. Hurlbut has one mill in operation at South Lee and has under construction a new $4 million mill located about one mile from its present plant. The new mill will be in operation in the second quarter of 1958.

W. Va. Acquires Virginia Folding Box

West Virginia Pulp and Paper Co. is acquiring the Virginia Folding Box Co., Inc., of Richmond, Va., a major supplier of packaging material to the tobacco industry. The transaction involves an exchange of 155,000 shares of West Virginia common stock for all of the stock of the folding box company. The transaction is expected to be completed by late November.

David L. Luke, president of West Virginia Pulp and Paper Co., said that the folding box company would operate initially as a subsidiary of the parent company, and would later become a division. The present management and other personnel of Virginia Folding Box Co. will continue to direct its operations. The box company is headed by Lewis G. Chewning, president.

Mr. Luke said that the addition of the folding box company will add to West Virginia's already highly-diversified operation, and would permit the company to service the tobacco industry's packaging needs on a more comprehensive basis. West Virginia currently produces almost every type of packaging paper product used by the tobacco industry.

Virginia Folding Box Co. has been a pioneer in the production of the popular flip-top and crush-proof cigarette boxes. It operates a modern plant in Richmond, Va., employing 200 people. The plant is equipped with eight late model web-fed gravure presses with in-line scoring and die-cutting equipment, as well as letterpress printing facilities. Its principal products are printed blanks for crush-proof cigarette boxes and the cartons which hold ten cigarette packages.

Largest Recovery Unit Starts Up

Longview Fibre Co., Longview, Wash., has just placed in service the world's largest recovery unit. Designed and built by Combustion Engineering, Inc., the unit has the capacity to burn 2,000,000 lbs. of dry solids per day and to generate approximately 300,000 lbs. of steam per hour.

The power plant at Longview has an installed capacity of 45,000 kilowatts. A 350,000 pound-per-hour Combustion boiler was recently added to the plant, which also includes Combustion recovery units installed in 1947 and 1952. Some indication of the progressive increase in size of chemical recovery units may be had by comparing the earlier units, having respective dry solids capacities of 600,000 and 1,050,000 pounds per day, with the latest 2,000,000 pound unit.

New Pulp Mill for British Guiana

Columbium Corp. of New York City stockholders have approved the action of the management in contracting for the erection of a pulp mill for the British Guiana Pulp & Paper Ltd., with a daily production of 200 tons, and the financing thereof. British Guiana Pulp & Paper Ltd. is a wholly owned subsidiary of Columbium Corp. The contract is with the engineering firm of V. Castorina of Italy. One of the principal bidders for supplying all the equipment is S. Maule & Co. of Italy. A 10-year contract for the sale of the pulp production is being arranged.

This is the outgrowth of development of Columbium's mineral resources, which is being carried on in a virgin forest of valuable timber in British Guiana, South America. The principal mineral produced from this area is pentoxides of columbium (niobium) and tantalum.

Pusey & Jones Has New Owners

Purchase of the 109-year-old Pusey and Jones Corp., manufacturers of paper machines, by a group of eastern business men headed by Joseph B. Ulicny of New Brunswick, N. J., was announced last week. The company will continue to operate under its present name. The transaction involved outright purchase of all capital stock, plant and equipment from the Aquaterra Co. of Wilmington, Del., the holding corporation. Mr. Ulicny, who is president of John Waldron Corp. and a director of Heller Brothers Co., becomes president and chief executive officer of Pusey and Jones.

Mr. Ulicny said that the new management would begin an immediate program designed to revitalize and expand the company's operations in such fields as new products, markets, research and engineering facilities, and to improve the sales and service organization in all divisions.

Pusey and Jones has sales of around $15 million annually and employs nearly 1000 persons.

Strike Settled at Consolidated

The strike of the United Papermakers and Paperworkers against Consolidated Water Power & Paper Co. ended last week when agreement was reached between the company and the union.

Announcement of the strike's end was made in a joint statement by the company and the union, which said negotiations were completed in an atmosphere of good will. The agreement resulted from negotiations between the company and the union which were conducted by the Federal Mediation and Counciliation Service. Terms of the agreement were accepted by the union membership at special meetings.

Involved in the 20-day-old strike were 1,125 papermakers at the company's Wisconsin Rapids, Biron, Wisconsin River, and Stevens Point Divisions and 185 members of Office Workers International Union 95 who respected their picket lines. In addition over 1,200 employees belonging to other unions were sent home for lack of work.

A new boiler and steam turbine plant was put into operation last week at the Biron Division upon settlement of the strike.

Built to provide electrical power and process steam requirements for the company's new, high-speed coated paper machine and expanded auxiliary facilities which went into operation in June, the new plant has one of the highest pressure boilers in the pulp and paper industry.

The new two-Cyclone pressure-fired boiler and auxiliary equipment are designed to produce 250,000 lbs. of steam an hour at 1,450 lbs. pressure and at 950° F. It has over 24,000 sq. ft. of effective heating surface and will burn 360 tons of coal per day.

The boiler supplies a new 15,625 kilowatt single extraction back pressure turbine which provides 400 lbs. of extraction pressure to an existing 9375 kva. turbine generator unit and 35 lbs. of back pressure for process use.

At the hottest part in the boiler furnace the temperature reaches 3,000° F. Although it burns coal it is ignited with fuel oil. The high furnace temperature permits the ash to be removed in the molten state. The "liquid ash" or slag flows from the furnace to a slag tank where it is cooled, forming glass-like slivers from which the water can be easily drained.

Equipment suppliers were: boiler, Babcock and Wilcox Co.; air compressor and fan, Ingersoll-Rand Co.; feed water heater, Foster Wheeler Co.; Deaerating heater, Elliot Co.; coal crusher, Pennsylvania Crusher Co.; coal-handling equipment, Chain Belt Co.; controls, Bailey Meter Co.; piping, Midland Pipe & Supply Co.. Crane Co.; turbine generator, General Electric Co.; boiler feed pump, Ingersoll-Rand Co.; and water treatment system, Infilco, Inc.

1700 End Strike At Bird Plant

A 14-week strike of 1700 employees of the Bird & Son Co. plants in Norwood and East Walpole, Mass., ended October 8. Employees accepted a contract providing a six-cent-an-hour wage increase and other benefits.

The strike began in Norwood July 2 and at the main plant in East Walpole July 17. The new contract will run through May, 1959.

Westvaco Asks NLRB Ruling on Supervisors

Officials of West Virginia Pulp and Paper Co. are filing a motion with the National Labor Relations Board to clarify the status of hourly paid supervisors at the Covington, Va., Luke and Williamsburg, Pa., mills.

John A. Luke, division manager at Luke, pointed out that a number of hourly paid supervisors at the three mills are now included in the bargaining unit and are covered by the labor agreement between the company and the United Paper Makers and Paper Workers of America (AFL-CIO).

"Since these men perform the same kind of duties and have the same responsibilities as salaried supervisors, we expect them to be fully effective representatives of management," Mr. Luke said. "For these reasons we have felt for several years that they do not belong in the bargaining unit."

Paper and Board Production

According to the American Paper and Pulp Assn., the ratio of the United States production to mill capacity fo rthe week ending October 4, 1957, was 91.7 per cent compared with 92.8 per cent revised for the preceding week. The ratio was 100.6 per cent for the corresponding week a year ago. Mills producing newsprint exclusively are not included.

The paperboard production ratio for the week ending October 4, 1957, was 97 per cent, compared with 99 per cent for the preceding week and 95 per cent for the corresponding week last year.

(Detailed statistics on page 46.)

Marathon Proves Value of Turbine Aeration

Oxygen conditions in the Wisconsin river were greatly improved this summer by artificial aeration of river water by Marathon Corp. During the past summer period when warm water and low flows depleted the oxygen to a minimum, the newly developed aeration method whipped into solution in the river here a minimum of 12,000 lbs. of oxygen daily. Following preliminary experiments a year ago, Marathon this spring equipped four of the seven turbines at its Rothschild mill to permit an extended test. Tubes were installed to feed air into turbines from which the engineers always previously had carefully excluded all air. High speed activity inside the turbine mixes the air and water.

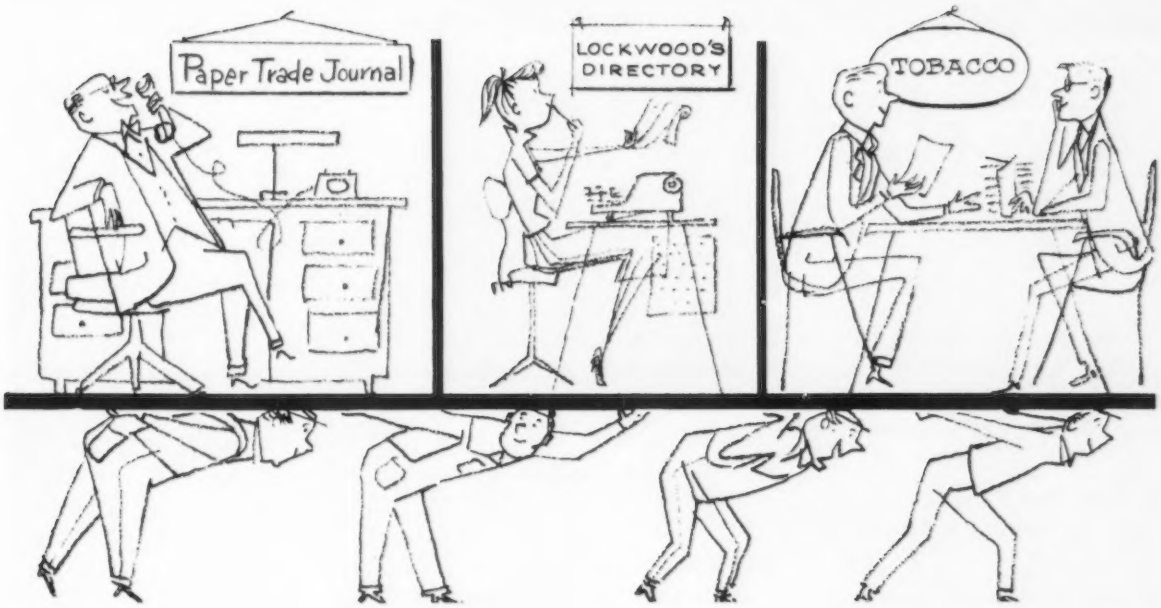
Measurements of the results at Rothschild proved the value of the method for improving the stream. Because of low flows resulting from lack of rainfall and low levels in upstream reservoirs, water from upstream reached the mill containing sometimes less than one part dissolved oxygen per million parts of water, the lowest experienced during the years that the mill has kept records. This compares with the state's official standard of three parts per million for game fish survival and five parts for reproduction.

Under this year's adverse conditions, Marathon's turbine aeration added as much as two parts per million to the water before passing it downstream—enough to be of real importance in improving stream conditions.

Cost of using this method consists primarily of decreasing the electrical power produced by the aerating turbine. This expense proved low enough to be economically supportable and is now considered no obstacle to continuing use. Whether turbines are damaged internally by the presence of air is still undetermined by the summer's tests. This can be found out only by more extended use of turbine aeration, followed by tearing down for internal inspection.

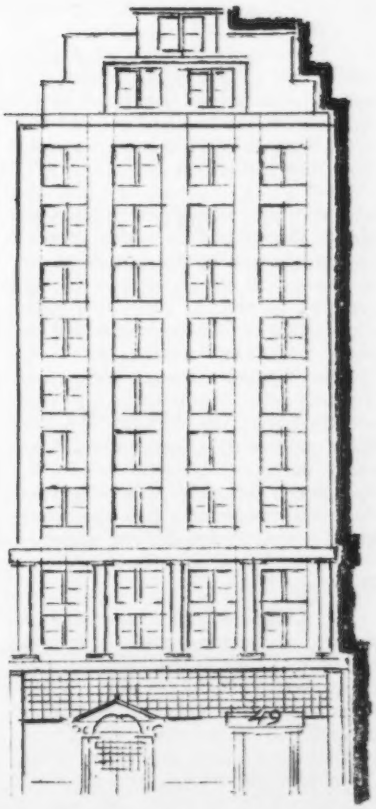
Glassine Publicity Moves

The Glassine & Greaseproof Manufacturers Assn. has announced that it has moved its publicity department to new and larger quarters at 50 E. 42nd St., New York 17, N. Y. The association's headquarters remain at 122 E. 42nd St.



We Are on the Move.....

Having outgrown our present office space, we are this week moving our New York offices to the eleventh floor of 49 West 45th Street. Here in our new, much larger quarters, with new equipment, more elbow room and the comforts of air conditioning, the editors look forward to serving our readers better than ever. You are invited to come up and inspect our new home.



To the 11th Floor

49 W. 45th St., New York 36, N.Y.

Danger of Excessive Over-Production Eased

Danger of excessive over-production in the paper industry has been eased during the past year by the postponement or scrapping of about five million tons of projected increases in annual paper and paperboard producing capacity, David L. Luke, president of A.P.P.A. and West Virginia Pulp and Paper Co. told more than 1,000 purchasing agents of the Southeast in their 14th annual conference in New Orleans.

"I do not mean that we have no excess capacity today and that more is not in prospect," said Mr. Luke. "Like a number of other aggressive and competitive industries, we have already overbuilt to some extent."

David L. Luke

Moderate Capacity Excess

Mr. Luke said that further additions already in the course of construction seem likely to maintain a moderate excess of capacity in the paper industry at least until 1960, even if the economy continues on its recent high plateau.

He noted that production of 15½ million tons of paper and paperboard during the first six months was three per cent less than the output for the same period of 1956, even though capacity was greater.

"Frankly, I don't take this minor reduction in production too seriously," Mr. Luke stated. "It is small and much of it is the result of inventory liquidation by our customers. Despite this inventory situation we produced 18 per cent more in the first half of 1957 than in the first half of 1954 and 15 per cent more than in the first half of 1955."

"Such a rate of growth in output and sales demands a roughly corresponding growth in capacity and some marginal capacity to provide for further growth in demand, if our industry is to keep prepared to provide adequate supplies and service to our customers and the public," Mr. Luke pointed out.

"Our capacity becomes truly excessive only when it grows at a rate significantly faster than demand. We have had a moderately faster increase in capacity during the last year or two, but fortunately, the more extreme excesses that were threatened a year ago appear to have been moderated," he added.

Prices and Costs

Mr. Luke said that substantial increases in operating costs, largely determined by factors outside the control of producers, offer formidable obstacles to reductions in prices of paper and paperboard, despite the moderate surplus of production which now exists.

He said customers could anticipate long-term gains in lower costs and improved products as a result of research, experimentation and new manufacturing efficiencies.

New Developments

"We are far from having reached the end of the road of improving our products and developing new ones," Mr. Luke said.

As an example he mentioned that his company and others in the industry have an idea that films can be produced cheaply from woodpulp instead of the involved chemical process required today.

He also said that his own company may soon offer a paper which has the characteristics of elasticity.

"We are already making pilot plant runs of such a paper," he said, "and we have found that we can get elasticity in paper without going through the expensive process generally associated with polymerization."

W. Mich. to Offer Paper Sales Course

Paper Sales, a third opportunity for specialization within the paper technology department at Western Michigan University, will be offered in the fall of 1958, it has been announced by President Paul V. Sangren.

This program is sponsored by the Salesmen's Assn. of the Paper Industry, and the curriculum has been approved by the university. This curriculum includes studies in paper technology and 12 other academic departments of the university: economics, business, basic studies, chemistry, physics, speech, physical education and political science.

A number of students on the campus are planning to transfer to this curriculum so that both first and second year training can be put into effect next September. Scholarships will also be provided through funds contributed to the paper sales training fund.

Central figures in the planning of the program have included Dr. A. H. Nadelman, head of the paper technology department, and Dean George E. Kohrman of the School of Applied Arts and Sciences, for the university, along with representatives of the Salesmen's Association, with R. C. Johnson of Chicago serving as chairman of the SAPI sales training committee.

Further information may be obtained by writing the University, or SAPI at 122 E. 42nd Street, New York.

Something New and Not Pleasant

Readers planning to attend the Canadian Pulp and Paper Assn. convention in January at the Mount Royal Hotel in Montreal should take note of the following:

Although the convention does not start until Wednesday morning, the hotel is insisting that reservations must be picked up by Monday evening. Other nearby hotels are: Ritz-Carlton, Berkley, Laurentian, and Windsor.

Report on Canadian Fine Paper

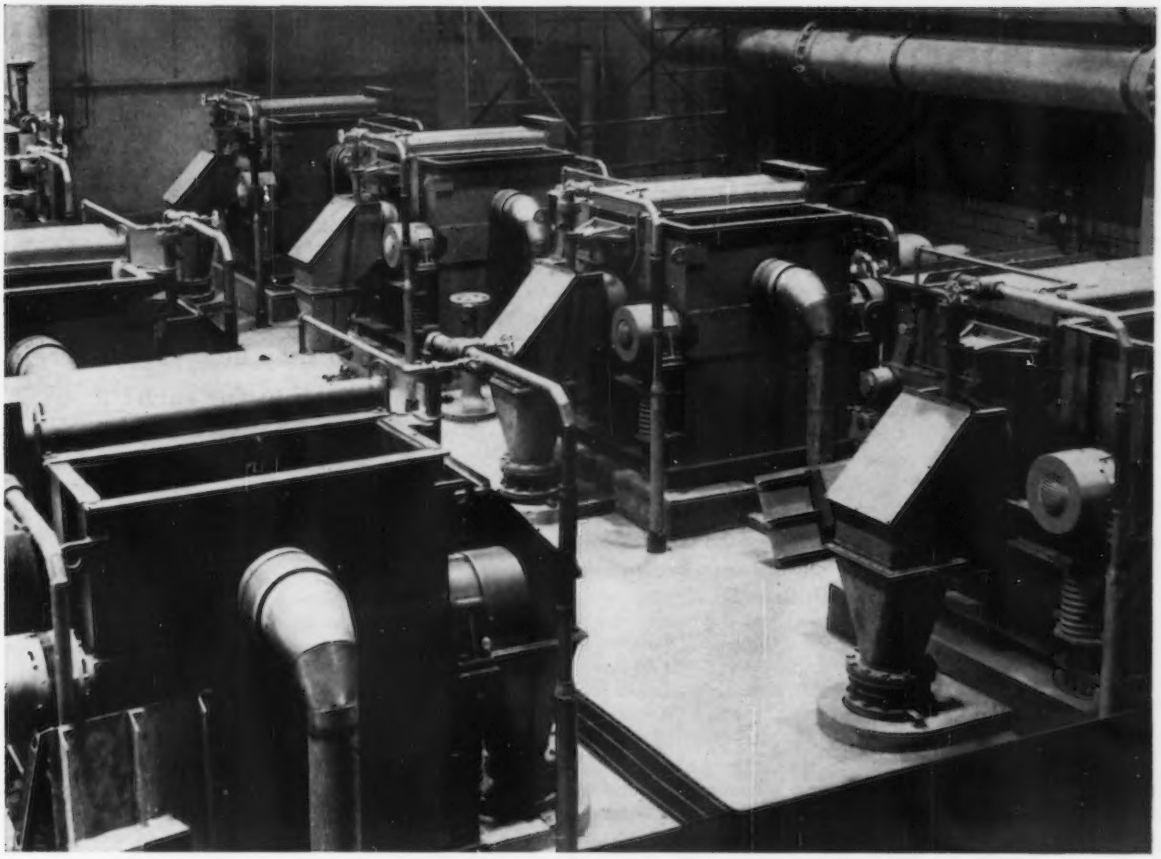
Canadian fine paper production in August was 21,295 tons as compared with 21,341 tons a year ago. Production for the year to date increased by 4.8 per cent and totalled 173,852 tons as against 165,960 tons in 1956.

Shipments to export markets during August increased from 1,170 tons in 1956 to 1,631 tons this year. Exports for the year to date remained at 10,500 tons, a figure fractionally higher than a year ago.

During the month there were 2,100 tons of coated paper produced as against 2,142 tons a year ago. Shipments for the month declined from 2,285 tons in August 1956 to 1,938 tons last month. For the year to date, 19,767 tons of coated paper were produced, an increase of two per cent over 1956. Total shipments increased by just over one per cent.

Newark, Del. Explosion

An explosion of undetermined origin wrecked a research laboratory of the Continental Diamond Fibre Division of the Budd Co. in Newark, Del., about noon on October 10. Plant officials said no one was in the lab at the time. Damage was estimated at $10,000 to $12,000. The blast will have no effect on production.



BIRD VIBROTOR SCREENS

FOR QUALITY, SLOTTED PLATE SCREENING OF BIG TONNAGES AT HIGH CONSISTENCIES

The installation pictured is handling the entire production of bleached sulphate in one of the biggest of the new mills — at 1.5% consistency through .012″ and .010″ plates.

Vibrotor Screens are being used with equal success on unbleached as well as bleached sulphates and sulphites, on semi-chemicals, on newsprint and on deink stocks.

Ask us to make recommendations, layouts and estimates for *your* stock and *your* tonnage.

BIRD MACHINE COMPANY

SOUTH WALPOLE, MASS.

REGIONAL OFFICES: EVANSTON, ILLINOIS
PORTLAND, OREGON • ATLANTA, GEORGIA

Canadian Manufacturers of Bird Machinery
CANADIAN INGERSOLL-RAND COMPANY, Limited, Montreal

Addition of Corn Starch at the Wet End Requires Study of Many Factors

Which of the many corn starch products should be used for each job? How do they behave? Where is the optimum point of application for each?

Daniel E. Lucas
Technical Service Department

Clifford J. McDowell
Manager, Eastern Sales-Service

Corn Products Sales Co.

The addition of corn starch to the paper machine furnish has been practiced in paper mills for many years. However, there is far from unanimous opinion as to either the preferred kind of corn starch for this application, or the conditions most likely to afford maximum performance at lowest possible cost.

A discussion of the reasons for such additions, the types of starches available and the methods in actual use today may contribute to greater understanding of the problems involved and hence help the mill operator find more satisfactory solutions to his requirements.

Many articles have been written on the subject of "why wet end additive." Most refer to the importance of a high hemicellulose content and its prominent part in the manufacture of all types of paper and paper board. Also many, but not all, paper makers will agree that over the years the necessity for increased production has advanced in the direction of excellent mechanical and chemical achievements for the paper maker. Could it be that additives are necessary to replace part of the hemicellulose or natural gums formerly available for fiber-to-fiber bonding by long slow beating? Also that today's high paper machine speeds tend to produce a weaker sheet.

Authorities hold the opinion that without such additives as corn starch the increased production and improved paper qualities would not have been possible. The swollen starch granule may be called first cousin to natural hemicelluose and similarly has high adhesive and water holding power. Since it also offers versatility, availability and uniformity at low cost, native American corn starch is used by the paper industry at the rate of thousands of tons per month.

Many fine writing mills add starch to their furnish to increase the internal strength or fiber-to-fiber bonding, and produce a better closed-up sheet. Other users find such a starch addition beneficial because it aids in the retention of various fillers necessary in the production of certain specialty grades. Cylinder board mills frequently add starch to improve adhesive between the filler and liners, improve the strength characteristics and obtain a better top liner wax pick test. Last but definitely not least is the use of corn starch by the southern kraft bag paper mills to increase mullen and tear when for "unknown" reasons these characteristics drop below standard.

The performance of the starch in these cases is certainly due to the combined properties of adhesion, suspending ability and attraction for cellulose fibers.

Whether the usefulness of starch additives to the wet end of the paper machine is due to such factors as mechanical absorption, selective absorption or molecular attraction, it is a fact that the starch should be cooked, or pasted, to realize benefit from its addition. While the pasting is usually done in a starch cooker prior to addition, some users are able to add raw starch, relying on the heat of the machine for gelatinization.

Many Variables Involved

Methods of addition and preparation are as varied as the types of starch additives but it is a fact that corn starch in its natural and granular form is relatively insolable and practically inert. When its water suspension is heated to 140-170°F., the individual starch granules swell, absorb water and form a viscous paste, or gel. It is in this state, whether precooked or gelatinized on the drier, that starches demonstrate their properties of adhesion, collodial stabilizers or suspending agents, and chemical reactivity. Such results, obtained with the starch, are measured by increased mullen and tensile tests, higher densometer readings, and improvement in the scuff resistance, wax pick and finish of the surface of the sheet or board.

There are many factors that alter the behavior of precooked starch; chief among these are the type of starch, the amount of water available for the swelling and pasting of the starch, the temperature to which the starch suspension is heated, and the presence of other ingredients in the starch-water system. Each of the above factors is involved in every paper mill application of starch, and each must be related to the desired performance of the starch additive in a specific set of circumstances.

There are so many variables that influence the performance of starch addition to the wet end that a completely satisfactory laboratory pulp testing system, which will predict starch performance with any degree of significance, has not been developed.

The type of furnish, water supply and other chemicals added to the stock influence starch effectiveness to the extent that each individual system must be evaluated independently. This is the reason no single class of corn starch is operable under all circumstances, and many types are required to meet the needs of the individual mill.

Thick Boiling—Unmodified

This is the regular, or pearl, starch of the corn wet milling industry, and is probably the most widely used corn starch wet-end additive. It is frequently cooked at five-ten per cent solids prior to use, but is also an effective raw additive where this practice is satisfactory, and is usually added at one-three per cent concentration, based on pulp.

Because it is unmodified, and is the basic product of the corn wet milling process, regular thick boiling corn starch is the most economical corn additive in many applications.

Thick Boiling— Specially Modified

There are two classes here; one is a true starch derivative and the other a low cost special treatment of regular pearl starch. The first of these is typified by the recently developed starch ethers. While these are thicker cooking starches than the regular products, the presence of the reactive substituted groups is of primary importance in their effectiveness as wet-end additives.

The second type of product, also of greater viscosity than pearl starch, is the result of a less complex treatment that provides more resistance to granule breakdown than regular starch. When either of these products is cooked up with small amounts of caustic or borax, their pastes are very similar to those of the root starches. When so prepared they have been shown very effective with respect to retention of fines.

Thin Boiling

Corn starch products of this type, treated to reduce the hot viscosity or swelling power of the native starch are rarely used as wet-end additives in light weight papers. However, several board mills have found thin boiling starches very effective wet-end topliner additives for improvement in calender operations directed at the printability of the liner.

Oxidized

Oxidized, or chlorinated, starches are preferred products for surface treatment, and seldom considered in wet-end additions. It is, however, true that there are a number of mills, using oxidized starch at the size press or tub, who find it convenient to use the same product at the wet end.

There are some users also who prefer to cook their wet-end additive at 20 per cent solids or more, thus reducing the frequency of starch preparation. The oxidized starches, because of their low viscosity and non-congealing characteristics, are particularly suitable in these instances.

Pre-Gelatinized

Any starch product, modified or not can be pre-cooked by the starch manufacturer. For wet-end starch sizing there are two general types used regularly in this classification.

One is the regular pearl starch pasted and dried simultaneously by the starch manufacturer; the other is the thick boiling starch ether similarly prepared. While convenience is certainly the prime consideration in the use of these products there are certain mills that attain increased mullen, tear and scuff resistance not found with regularly cooked starches or raw additives.

These pre-gelatinized products are generally considered to lie somewhere between raw and completely cooked starch, from the standpoint of overall efficiency.

Pre-Cooked vs. Raw Starch Addition

While a pre-cooked starch addition is important for lightweight papers, the starch need not be cooked prior to its introduction into the system of heavy paper, liner and board machines. Some mills use starch advantageously by adding it to the furnish in raw or granule form, relying on the heat of the drying cylinders to develop its effectiveness.

Many authorities feel that the practice of adding raw, or uncooked, starch does not allow maximum development of the potential advantages of starch addition. Losses of the raw starch during sheet formation can be high, and the limited amount of water available for pasting in the semi-dry web may reduce the starch effectiveness. Also the time required for starch pasting must be taken into consideration. With today's high speed machines many will claim that the limited water availability plus the shorter time on the driers of especially lightweight papers is not conducive to complete or most effective starch pasting.

This method of addition has the least possible effect on the speed of the paper machine, since it does not affect the rate of drainage during sheet formation.

For the majority of mills that find it necessary to use cooked starch, the problems of cooking temperature, point of addition, and storage and handling facilities, must be resolved.

Cooking Methods

The typical procedure is to cook quantities of starch to 170-185°F., with or without additional alkalies and/or softeners, at about 10-12 per cent solids. Cooking is usually done in an open tank, kettle or continous cooker by direct steam injection. This cooked starch can be added directly to the wet end in the desired amounts, or diluted and cooled for storage prior to use.

Development of continous cooking equipment for this application has eliminated the need for relatively large cooking and storage facilities, and minimized the possibility of changes in cooked starch properties during storage periods prior to actual use. While the regular cooking equipment is usually traditional in design and operation, the continous starch cookers are somewhat more complex in detail.[1]

This latter equipment is available

[1] See "Continuous Starch Cooking Is Effective Means of Preparing Starch for Furnish," Paper Trade Journal, September 23, 1957.

Where Is Best Place To Add Starch?

1—Cooked starch is best added as close as possible to the head-box and still get good mixing.

2—Pre-gelatinized products are usually added as early as possible to get dispersion and swelling.

3—Raw starch is also added as early as possible to get dispersion and opening of the granules.

from several specialty manufacturers, although some larger mills often find it advantageous to design and construct their own equipment, with the assistance of the starch supplier.

Where to Add the Starch

Corn starch additions may be made during stock preparation, just prior to sheet formation, or at some intermediate point. While this is usually determined on the basis of convenience in a particular mill, certain general patterns have been evolved.

It is now felt that cooked starch addition is most efficient when done at the closest point to sheet formation commensurate with complete mixing of the furnish and the starch. This technique allows the least possible mechanical damage to the swollen starch granule and affords maximum effectiveness of the starch in this form.

The pre-gelatinized products are usually added as far back in the system as possible. This is done to insure complete dispersion of the swollen and dried particles or starch granules in the furnish by the subsequent beating, refining and hydration of the stock. Raw starch addition is also more commonly practiced back in the system. Here the mechanical work of the stock preparation system will have a beneficial effect on the raw starch granule as well.

Table I indicates the findings of a survey of ten mills producing a wide variety of paper products from a diversity of furnishes.

It can readily be seen from the table that in current practice there is a wide variety of starches and applications at the wet end of the paper mill. Because of this variety it is usually necessary for the mill operator to study his needs, economics, and end products before deciding which starch to use, whether to cook or introduce raw, and where the addition should be made.

Technicians connected with leading starch suppliers are constantly studying the problems confronting paper mill operators in an effort to assist them in solving problems throughout the mill.

TABLE I

PRODUCT	FURNISH	QUANTITY OF STARCH (Based on pulp)	STARCH PREPARATION CONCEN- HOW ADDED	TRA- TION	POINT ADDED
Tissue	Bleached and semi-bleached kraft	¼-1%	Dry		Beaters
Paper and Envelope Stock	Bleached kraft	1-2%	Cooked	5%	Fan pump
Kraft Board	Unbleached kraft	1-2%	Dry		Beaters
Magazine Paper	Bleached kraft	½-1½%	Cooked	5%	Fan pump
Wallboard Liner	Semi-chemical pulp	¼-1%	Cooked	5%	Fan pump
Bond, Glassine and Greaseproof	Bleached sulphite	1-2%	Cooked	4%	Fan pump
Specialty	Bleached, unbleached sulphite and kraft	¼-2%	Cooked	4%	Fan pump and beater
Paper and Paper Board	Bleached kraft	1%	Cooked	4%	Fan pump
Chip Board	Waste and bleached sulphite	1-1½%	Raw		Beaters

JUST PUBLISHED

Now...For the First Time in Book Form...

PULP, PAPER AND BOARD MILL MAINTENANCE

This handy, 126 page book belongs in your library. In easy-to-read language it brings you complete procedures for plant maintenance in kraft pulp mills, semi-chemical mills, bleach plants, Fourdrinier machines, cylinder machines, stock preparation equipment, power plants, electrical finishing . . . all other paper and pulping operations.

•

Based on actual in-plant experience and prepared by well-known men in the paper industry, this brand new volume has been edited by John C. W. Evans to fit a definite need.

•

If you are interested in improving maintenance procedures, reducing machine downtime, improving operating conditions and increasing plant efficiency, PULP, PAPER AND BOARD MILL MAINTENANCE points out what to do and how to do it.

Act now to receive a First Edition copy. If not more than satisfied, return book for full refund.

LOCKWOOD TRADE JOURNAL COMPANY, INC.

49 West 45th Street, New York 36, N. Y.

Yes, rush me post-paid a First Edition copy of your just-published book, PULP, PAPER AND BOARD MILL MAINTENANCE at special low price of $2.50

Name..... Title.....

Company .....

Address .....

City..... Zone..... State.....

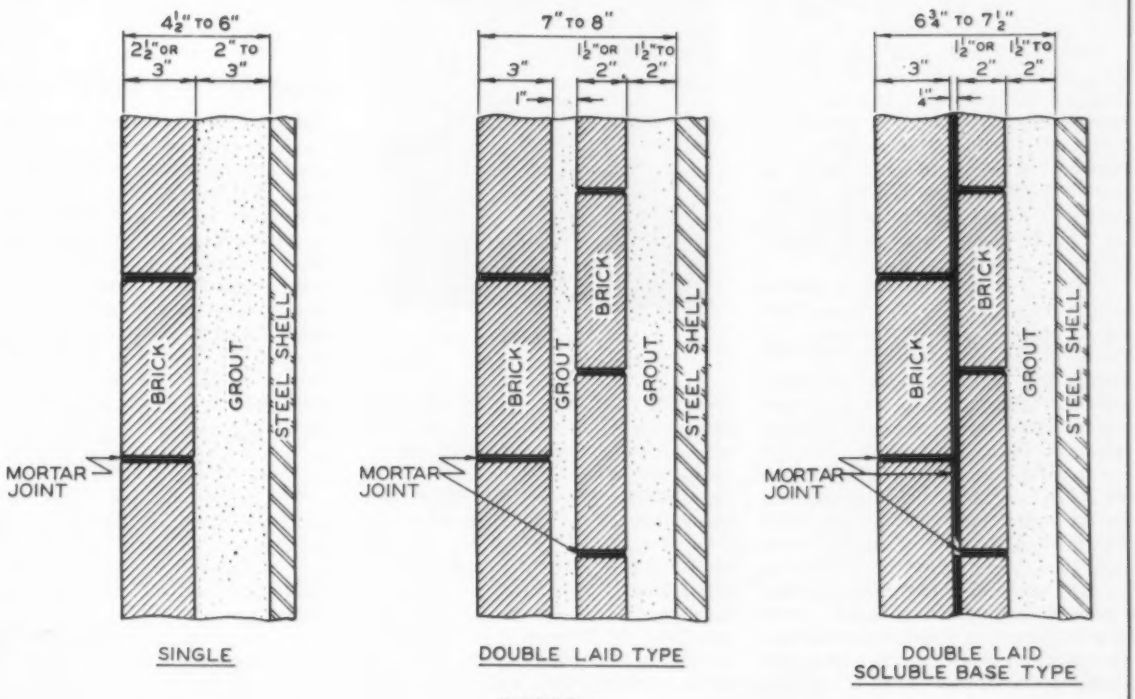


FIGURE 1

Modern Sulphite Digester Linings — Recent Technical Developments

E. F. Tucker

Stebbins Engineering & Manufacturing Co.
Watertown, N. Y.

Few papers have been presented on the subject of sulphite digesters and their protective linings. Therefore, it seems appropriate to include in this dissertation a brief résumé of the history of the development of the digester and its lining as we now know and accept it. The history of the development of the sulphite process itself is well recorded; but little has been said about the development of the digester, which is the primary producing unit of the industry, and of the protective lining on which its life depends.

History of Sulphite Linings

The first cooker used by Tilighman in 1866 had a loose lead lining, which required repair or replacement after every cook. The same type of vessel was used by Ekman and others during the development of the process in Sweden; and was protected by a similar lining, which eventually was reinforced and held in place by lead-covered iron bands bolted to the steel shell. With the beginning of commercial sulphite production, a single-course brick sheathing was tried as a means of supporting and holding the lead in place. A patent by Mitscherlich in 1878 disclosed the rudiments of this procedure. Folin, in Sweden, described a similar installation in 1873—and Pierredon, in France, during the same year patented a brick lining set in cement, with the joints protected by a poured lead pointing.

In this country, from 1884 on, continuous lead linings supported by brick laid in various types of Portland cement mortars and having the joints protected with many varieties of silicate cement and other pointing materials were in general use. Installations made by Mitscherlich, Friend, Stebbins and others all followed similar specifications. The brick linings varied in thickness, but were always more than four inches thick and composed of various types of refractory brick, stoneware and similar ceramic bodies. During this period, there were also a number of expedients tried in an effort to solve the digester corrosion problem. A few cast bronze digesters were built, one of which exploded with disastrous results. Steam-jacketed vessels were used for the purpose of precipitating a protective

Paper presented at the 38th Annual Convention of the Superintendents Association held in Chicago, Ill. May 21-22, 1957.

calcium sulphate coating on the inner shell, and some efforts were made to line with bronze and lead plates.

Sometime during the late 1890's, complete brick linings were installed in Scandinavia, omitting the lead liner. Our records indicate that the first all-brick lining in the U.S.A. without a lead backing was installed in 1902. It seems certain that, from 1900 on, few, if any, combination lead and brick installations were made in sulphite digesters located in any pulp producing country.

During this early period, a distinct difference in the trends of lining technique between North American and European practice began to develop. Wester and Aggeryd, in their introduction to a splendid work on digester lining materials, have traced the development of European practice with the trend toward the use of silicate cements and thin double course linings four inches or less in thickness. This trend has continued until the present time; and, now, most linings in Europe are from three and one-half inches to four inches in thickness, using double course construction with a face course of carbon blocks laid or pointed with a synthetic resin cement over a backing course of ceramic material laid solidly in a silicate-type cement. Some thick linings with ceramic brick face courses similar to those used here are in service, particularly in mills outside of Scandinavia, but most of the brick-lined digesters reported hold closely to the specifications mentioned.

First North American Linings

On this continent, the use of litharge-glycerine cements, both to lay and point the face course brick in sulphite digester linings, was definitely established in 1893, and probably was accepted rather extensively before that date. From 1902 on, nearly all linings were installed with the face course brick laid in a litharge-quartz-Portland cement composition joint, with the backing composed of a Portland cement and Chamotte or quartz grout; frequently with a second course of relatively dense brick placed or puddled in the backing grout to provide added shell insulation. These linings had a minimum thickness of about five inches, but were occasionally extremely thick, some instances being recorded of installations having 16 inches of brick and concrete as a protective lining.

During the World War I period, and for a few years thereafter, when great expansion occurred in the sulphite pulp industry, almost every conceivable combination of lining materials seems to have been tried in the United States and Canada. At this time, production was the primary consideration. At-

E. F. Tucker

tempts to make linings thinner generally resulted in failure because of the manner in which the digesters were abused during operation; and there was little opportunity for proper experimentation and development. Several European linings were imported; and, in some instances, workmen were brought over to install them. Failures were very frequent. Through no particularly scientific approach to the problem, it was gradually realized that linings on the order of seven or eight inches thick gave much better service than the thinner ones; and, about 1920, linings of such thickness became general. In 1913, during this period, the disastrous Laurentide explosion occurred; and, in his attempt to analyze and explain this explosion, Keay began the first scientific approach to the problems involved in the relationship of the steel shell of a sulphite digester to its lining.

Double-Laid Lining Introduced

During mid-1920's, the double-laid lining, as we now know it, was first introduced in this country—and almost immediately gained wide acceptance. A real scientific approach was made to the manufacture and testing of digester brick and the preparation of joint material and backing material of uniform quality with desirable characteristics for use in digester lining work. Some strides were made in obtaining uniform installation conditions; and a general opinion began to form that the design of digester linings was much more of a mechanical problem than one of chemical resistance. In 1927, another disastrous digester explosion occurred in Lancey, France. And, during his studies of this accident, Jarlier again moved closer to a scientific explanation of the effect of a lining on the steel shell it is designed to protect.

After the introduction of the double-laid lining, the puddle-back type rather rapidly disappeared; and practically all digesters on this continent were lined with two types of lining. Small digesters, in general, were lined with a single course lining; large ones, with the double course.

Soluble Base — a New Problem

Little or no change was made in this practice until the introduction of soluble base cooking, which created the neccessity of introducing a relatively impervious barrier between the face brick and the backing brick in order to prevent deep and free penetration of the cooking liquor. The success of linings for service in low acid strength calcium base liquor depended on the filling of the pores of the brick with a calcium deposit to render them impervious in a relatively short period of time. The soluble base liquors do not provide this filling action quickly; and, therefore, the barrier became necessary.

With the introduction of the soluble base type, lining installations in North America became standardized by three types of linings, specified to satisfy the digester size and the different cooking conditions.

My comments are confined to digesters designed primarily for the production of sulphite pulp or to those used for the production of a type of semi-chemical pulp requiring a similar protective lining. Observations reported are limited to ceramic brick-lined digesters. No particular consideration is given to the use of carbon linings of any nature, since complete carton linings are not presently in use in North America except in the production of kraft and other alkaline types of pulp.

Up-to-Date Picture

There are in operation in North America at the present time approximately 600 digesters of the type being considered. Of the 600 units, thirteen have some type of acid-resisting chrome-nickel-steel lining or cladding fabrication. Five hundred eighty seven digesters are brick lined. These digesters range in size from 14′0″ diameter globe rotaries and 9′4″ x 29′2″ vertical stationary through 19′0″ I.D. x 65′0″ high vertical stationary. Of the 587 digesters containing brick linings, all but about twenty are riveted. The numbers include the Mitscherlich horizontal-type digesters still operating.

In general, the design of the vertical shells, with conical bottom and spherical or radial dome top, is uniform and well known to everyone acquainted with the industry. All units are designed as unfired pressure vessels, according to ASME code specifications or regulations; but the existance of a lining, its possible effect on the steel shell, and the effect of the steel shell on it, have not been generally recognized by the

designers of digesters, and not at all in code specifications.

Insulation is not generally used on brick lined digesters in the U.S.A. and Canada, although several mills use various types. There is no evidence of acceptance of any standard insulating method or specification.

Another factor which must not be overlooked is that practically all digesters in North America are discharged by blowing at pressures of about 35 p.s.i. Reblowing and cold water washing are still very common. A small number of digesters, principally those using soluble base acid, are dumped, and not blown.

Single Course Linings

Figure 1 details the three standard types of linings now in use on this continent. The single course lining generally varies in thickness from a 4½″ minimum to 6″ maximum. The brick are usually either 2½″ or 3″ in thickness, and the grout variable to make up the desired total dimension. These linings are used mostly in digesters of 15′0″ diameter or less, operating on high combined or low acid strength calcium base liquor. There are a number of 16′0″ and 17′0″ inside diameter shells lined with 6″ linings because of certain special conditions and requirements.

Double Course Linings

The double-laid type is in general use in calcium base digesters of 16′0″ inside diamter and over. The great majority of these linings are 7½″ in thickness, the face brick being usually 3″ thick, while the backing may vary. The 7″ installations are in small welded shells or in shells with thin inside butt straps. The 8″ linings are used only in 18′0″ and 19′0″ inside diameter units.

Soluble Base Linings

The soluble base type lining, varying in thickness from 6-¾″ to 7-½″, is in general use in all digesters operating with one of the soluble base acids, regardless of digester size. The thickness may be varied, depending upon digester diameter and the existence of heavy internal butt straps requiring a relatively thick grout layer.

For replacement, the single course linings are always completely removed; and this feature is attractive in some cases where periodic examination of the interior of the shell is considered essential. In the double course linings, the life of the backing brink and grout is usually indefinite, provided the face courses are properly maintained. Face courses require periodic renewal; but the backing course may remain in place until government authority, the insurance carrier or owner require an internal inspection of the steel shell.

New Digester Designs Present Problems

In recent years, demands on digester linings have been greatly increased. Linings have been taken for granted. And, operators have not generally realized that adjustments may be needed or that modifications should be dedeveloped to meet these demands. The trend has been towards faster cooking, higher acid strengths, higher temperatures and pressures, or high pressure with lower temperature. New shell designs have been accepted without recognition of the limitations of linings of standard specifications and without time being allowed to develop proper lining modifications. In some cases, economies in shell construction have been made at the expense of the lining without appreciation of the extra load which was being placed on it.

Riveted shells were usually of rather conservative design, most engineers and consultants specifying working pressures of 100 or 125 p.s.i. when operating pressures were planned to be 80 p.s.i. maximum. Since strict adherance to the code provided a factor of safety of five, this conservative approach to design resulted in an actual operating factor of safety of approximately seven. This gave the digester shell a property that was formerly described as "rigidity", but which was actually a very low tensile stress in the steel, resulting in reduced dilation of the shell by pressures from all sources, thus causing the lining to remain in compression over a wide variation in operating circumstances.

More recent design practices, particularly in the case of welded vessels using high tensile strength steel, hold to a working pressure of from 100 to 125 p.s.i., with the code factor of safety at 4.5. But, many of these digesters are regularly operated at pressures of from 95 to 120 p.s.i. So, the actual factor of safety is about 6, and, in some cases, is down to the theoretical 4.5 design.

Shell Stress — The Big Problem

The stress in the steel shell arising from the differential thermal expansion and the permanent growth of the lining may more than equal the stress from the working pressure alone. It is conceivable that the factor of safety could drop to about two in an extreme case, although it must be admitted that high reaction stresses in the lining may, although not necessarily, cause failure of the lining before such a dangerous steel stress is reached. If the digester, at the peak of the cook, and already stressed as described, is subjected to some exceptional shock, such as an external cold draft or a sudden internal pressure rise due to failure of controls or other unexpected event, the shell may readily become stressed to a point of failure.

References cited at length in this paper analyze in great detail problems

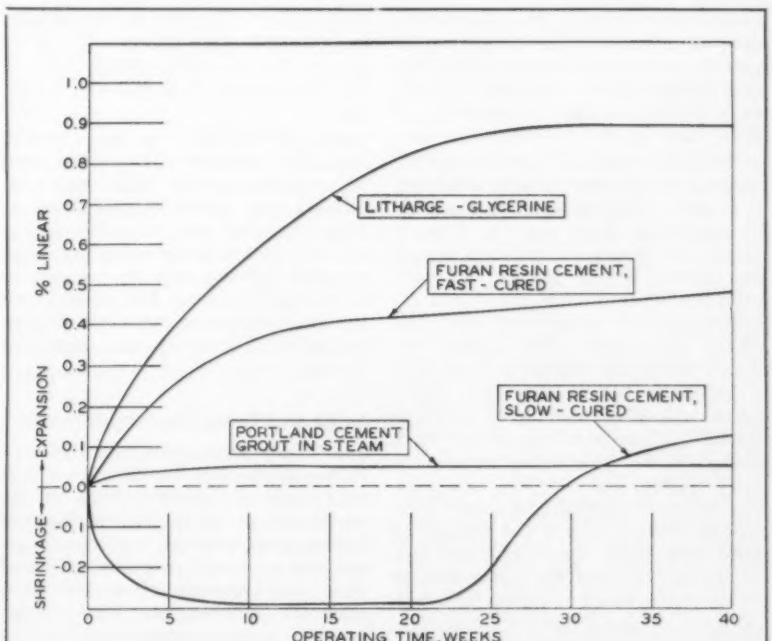


FIGURE 2

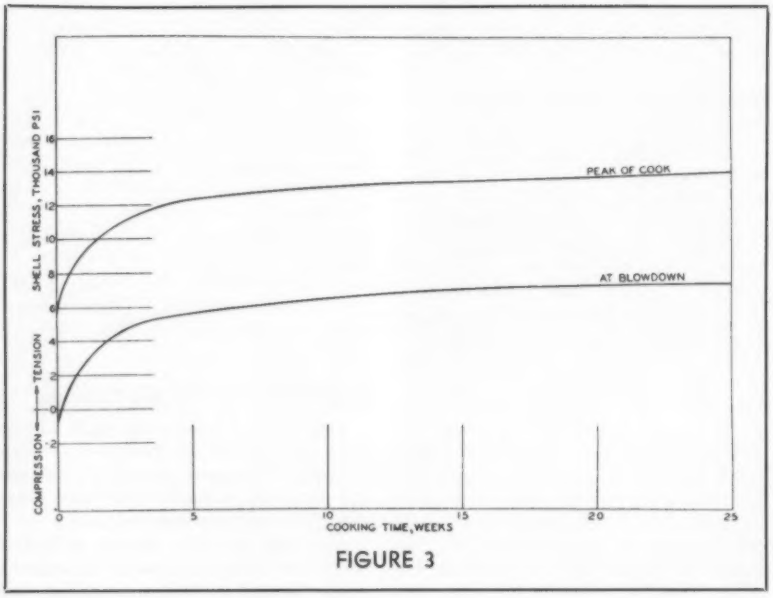


FIGURE 3

connected with out-of-roundness, geometrical inaccuracies, the effect of large fittings and circulating systems and other eccentric stresses present in steel digester shells before lining. Many situations associated with these conditions may have very serious effects on the relationship between a steel shell and its lining, few of which are good or favorable. If known and fully recognized, something may be done to offset such unfavorable effects. New shells recently fabricated have been erected under reasonably rigid specifications for accuracy. Close cooperation between engineers, consultants, shell fabricators and the purchaser is needed for a full understanding and proper solution of this phase of the problem.

With a record of several hundred digester lining case histories available, it is rather easy to select an incident or example to either prove or disprove almost any theory and practice regarding sulphite digester linings. We have examples of installations made with excellent materials under nearly ideal conditions which have given trouble, and others made with inferior wartime materials under almost impossible emergency conditions that gave excellent service and long life. It has always been easy to blame most lining troubles on brick quality; but we have many examples of lining difficulties, and even serious failures, where the quality of brick and other materials could not be questioned—and the cause had to be something which could not be passed off as poor bricks or a careless job.

The quality of brick and other materials is, of course, extremely important. Many lining failures have certainly been caused by inferior materials or improper combinations of materials, as well as unskilled workmanship. The proper specifications and desirable characteristics of digester lining components are treated in detail by Haas, Dietz, Kelly, Mainhardt, Wester, Aggeryd, Thomas and others in referenced works. Numerous methods of mathematical analyses have been devised and are explained in detail in works by McDonald, Wikborn, Matz, Fuller and many others. The data is too extensive to summarize here; and it is not necessary to do so in our consideration of the relationship of a shell and its lining.

For consideration by this group, a large mass of information and data may be condensed and its basic import explained very simply by reference to Figure 2. This chart illustrates a typical or average performance of some materials entering into the composition of a digester lining. The chart is not intended to be exact, but serves to comprehensively illustrate the points involved.

Joint and Grout Materials

A litharge joint material may be taken as one component having a very high total swell or growth. Properly designed and placed quartz and Portland cement grout provides a good example of a low total swell or growth. Between these two extremes are several other materials, including the brick, which follow a similar pattern.

A furane resin cement cured under two different conditions is also illustrated for the purpose of bringing out the dangers which may be developed by the use of a material having an excessive amount of shrinkage. This particular furane cement, if allowed to cure under warm dry conditions, will continue to shrink for about ten weeks, after which its volume becomes stable. On the other hand, if put in service or wet cured promptly, a normal swelling action takes place.

If the thoroughly set and dried material is then placed in service, it will never attain the growth that it would have if the curing had started before complete shrinkage had taken place; and it would require about twenty weeks of digester operation before the effect of original shrinkage would be completely overcome. The possible effect of letting a soluble base type digester lining stand for ten weeks or more after installation and before curing is quite obvious.

With accurate data on the swelling of various types of materials under different cooking conditions available, and by properly proportioning these materials in the final digester lining assembly, we are now in position to very nearly predict the effect of the lining on the steel shell and the curing period, which will be required, under these various conditions, to build up sufficient prestress in the lining so that the brickwork will not be subjected to high tension during any portion of the normal operating cycle. It is hoped that, with another two years of observation on installations made about two years ago, and very carefully checked, we will be in a position to predict results under all normal cooking conditions with extreme accuracy.

The effect of this growth on the steel shell and the development of prestress in the lining are well illustrated by Figure 3. These curves again are not actual curves developed from data on any individual linings; but are composites of what might be anticipated, based on our observations and measurements on a number of different linings. The curves are extended to twenty-five weeks only. We have readings in some cases over a period of more than two years—and the tendency of the curves is to flatten, but remain parallel.

Blowdown Stress

The shell stress at blowdown represents the stress developed by all forces applied to the steel shell, other than the internal stream pressure. It is particularly interesting to note the possibility of compression in the steel at blowdown during the first few cooks. This may occur until the swelling or growth of the lining overcomes the compression in the steel developed by

an excellent bond between the backing material and the steel shell, whereby the shrinkage of the backing material can actually exert an inward pull on the steel shell.

Consideration of Figure 3 in connection with operating practices will illustrate the fact that many dangerous circumstances may develop during the first few weeks of digester operation following a new lining installation. Any combination of events, which may cause high tension or excessive compression in any part of the brick lining, may crack the lining, or set up a shattering and spalling action which will continue progressively for a long time. It is conservatively estimated that, in an average 7″ to 7½″ lining, a stress of at least 3000 p.s.i. should exist in the steel shell to develop sufficient prestress in the lining for protection against the hazards of normal operation.

Welded Digester Lining Failures

Everyone interested in sulphite production on this continent knows of the extraordinary failures which occurred in the brick linings in welded digesters erected several years ago at the Anglo-Canadian plant in Quebec City and the Columbia Cellulose plant in Prince Rupert, B.C. Much can be found in the references regarding these failures.

During the same period, and for some years following a number of similar failures occurred in welded shells throughout the world. These have not been very completely reported; but we do know that there were several patterns closely resembling the failures mentioned.

All of these failures seem to have been purely mechanical, with vertical cracks being the principal cause of failure in linings otherwise perfectly sound and unaffected, constructed of materials which appeared to be excellent for the purpose in every way.

Studying the Strains

To tie in the theoretical and practical tical laboratory scale work done over a period of many years, we began an extended study of shell strains on operating digesters to run concurrently with our investigations of material swelling and growth under conditions as actually found in the sulphite industry. Strain gauge stations have been placed on a number of operating digesters; and, in one instance, with the cooperation of a major producer, we were able to place stations on a newly erected welded shell and make a comprehensive study of the strains developed during testing, lining, curing and subsequent operation. We now have a record of nearly two years' operating results—and the actual strains in the shell plate are remarkably close to those calculated from available data on material swelling, thermal expansion, thermal conductivity and modulus of elasticity.

Measuring the Strains

For our strain gauge measurements on lined digester shells, we have used a 10″ Whittemore strain gauge, which is a mechanical gauge or Extensometer. The accuracy of this instrument is between 20 and 30 microinches. Each individual instrument is calibrated with a standard test bar, and great care is exercised in preserving the instruments against any shock or strain. The strain gauge stations are placed for measuring both vertical and horizontal strains by welding Type 316 stainless steel buttons to the shell of the digester, and then drilling these buttons to provide a socket for the gauge points—and recording zero readings for each station in comparison with the standard test bar. Shell temperatures at the stations are recorded by potentiometer readings, with the thermocouples placed in a small hole drilled directly into the steel shell at each station. Ambient temperatures are carefully recorded so that all necessary adjustments can be made.

Some criticism has been offered to the use of this gauge for measuring tensile strains in steel shells under pressure. It is contended by some authorities that the electrical gauge of the SR-4 type is much more sensitive. This may be true; but, under the conditions existing in an operating sulphite mill, there are too many adverse influences to make good control possible. We consider the SR-4 type set-up as being impractical for long-term use and for extended studies such as we are making under the conditions existing.

The measurements made on a number of operating digesters throughout this country check consistently, not only with each other but also with similar data developed under very different conditions in a number of European mills. Also, the measurements obtained with the mechanical strain gauge coincide very closely with the calculated strains derived from the growth factor of the materials involved, differential thermal expansion and other known factors.

Evaluations of Data

With a large amount of field and experimental data now available, which can be combined with extensive and thorough mathematical analysis approaching this problem from many different premises, we have at our disposal some very useful tools in the form of simplified calculations, based on known factors and constants established in actual commercial performance. We can safeguard linings and add many years to their useful life by understanding and using the basic principles outlined here, which have been generally ignored by those presently responsible for digester operation. The overall average of digester lining life in North American practice is over eight years; and, at the present time, there are many more linings in service over eight years old that have failed during an equal period with lives of less than eight years. There are, as a matter of fact, a large number of linings more than eight years old which are in such good physical condition at the present time that an almost unlimited life is indicated. This record can be improved.

Importance of Crew Education

The manufacturers of brick and other ceramic materials will not guarantee their products, nor will the producers of various acid-proof cements extend certified guarantees. The specialized contractors engaged in the installation of digester linings cannot afford to police their installations for an unlimited period, nor can anyone write a set of rules and regulations which would include an answer for every conceivable contingency arising in everyday sulphite mill operation. It may be bold, but nevertheless wise, to recommend that superintendents responsible for the operation of brick-lined digesters delegate someone to study the data available and referenced here for the purpose of setting up an elementary educational program for tour bosses, cooks and others directly responsible for the handling of digesters. The purpose of such a program would be to impart sufficient information so that exceptional circumstances may be appraised and analyzed on the spot and an operational procedure assured which will not jeopardize a lining installation. The principles, if understood, become simple; and most answers are a matter of plain common sense.

Summary

The brick lining in a digester may appear cumbersome; but it is an economically sound item of equipment, which has been a basic and indispensable factor in the building of a great industry. Alloy-lined or clad digesters represent an ideal, equipment-wise, on which much time, money and hard work must be expended before perfection is reached. A full recognition of the basic principles of the relationship between a mild steel shell and its lining, whether brick or alloy, will assist in obtaining this goal. Meanwhile, we must depend on brick linings now and for some time to come; and an intelligent understanding of just what we have and must use in the form of a steel shell and its

protective lining can make sulphite mill operation much easier, and the results of this operation more profitable.

References

H. O. Keay—*Paper 13*, no. 16; pp. 15-19 (Dec. 31, 1913)

—*ibid 13*, no. 17; pp. 19-20 (Jan. 7, 1914)

—*Pulp & Paper Magazine* 11: 1062-1068 (Nov. 15, 1917)

M. Jarlier—*Annales de Mines*—Dunod, Paris, (Nov. & Dec. 1929), (Mar. 12, Mar. 19, Mar. 26, 1931)

R. Haas—*Der Papierfabrikant 37* (5): 38-40 (1939)

—*Der Papierfabrikant 37* (21): 173-177 (1939)

—*Der Papierfabrikant 39* 10/11 pp 65-80 (1941)

—*Das Papier 3* (21/22) pp 415-421 (1941)

—*ibid 6* (3/4) pp 37-43 (1952)

—*ibid 8* (3/4) pp 49-52) (1954)

—*ibid 8* (23/24) pp 528-534 (1954)

—*ibid* 9 (19/20) pp 482-486 (1955)

—*ibid 10* (9/10) pp 201-205 (1956)

E. F. Tucker—*TAPPI 33* (1) p 29 (1950)

P. C. Stein—*Document* (Sept. 30, 1955)

Karl Dietz—*Document* (April 15, 1955)

Kogel—*Das Papier 3* (15/16) pp 313-317 (Aug. 1949)

C. A. McDonald—*Pulp & Paper Magazine of Canada*, p 174 (May 1953)

B. Thomas—*TAPPI 34* (1) p 16 (1951)

—Paper to be published in *Pulp & Paper Magazine of Canada*, Nov. 1957

H. W. Duggan—*Pulp & Paper Magazine of Canada*, p 179 (May 1953)

H. J. Kelly, R. Mainhardt and K. G. Strandberg—*J. Am. Cer. Soc. 37* (1) pp 18-26 (1953)

W. Matz—"Berechnung der Ausmauerung Stahlener Gefasse" *Verfahrenstechnik in Einzel darstellugen*, No. 1 Springer, Berlin. (1953)

Paul Voigt—"Konstruktive Schweisstechnische Lösungen im Chemischen Apparatebau", *Wissenschaftliche Berichte* Folge IX Schweistechnik 2, Teil II VEB Verlag Technik, Berlin (1954)

V. Wikborn—*Svensk Papperstidning* No. 4 and No. 6 (1956)—*ibid* No. 21 (1955)

A. Wester and B. Aggeryd—*Svensk Papperstidning*, Nos. 21 (1955) and 3 (1956)

Deutscher Normenausschuss DIN 0028061 (April 1956) Deutscher Normenausschuss DIN 0028000 (April 1956)

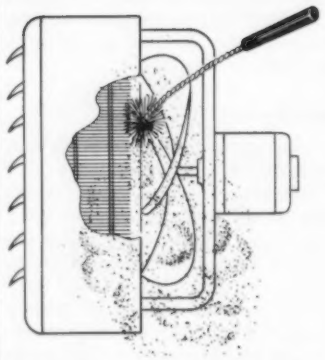


FIGURE 1 — CLEANING WITH BRUSH. Brush from motor side, place bag over unit.

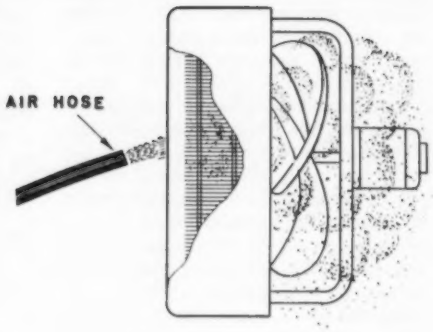


FIGURE 2—CLEANING WITH AIR HOSE. Blow from front, place bag over unit.

Maintenance Tips For Unit Heaters

Because of their capacity to provide a high degree of control over the velocity and direction in the delivery of heated air, unit heaters are being used more and more frequently in pulp and paper mills and paper converting plants —in almost every building area where concentrated controlled space heating is needed.

While modern unit heaters are generally free of service troubles, proper maintenance, particularly before cold weather sets in, can further reduce maintenance problems later on. To help simplify the fall check-up job, the Air Moving and Conditioning Assn. (representing 17 leading manufacturers of unit heating equipment) has developed and is recommending a simple series of preventive maintenance and inspection operations that will reduce troubles and cut heating costs. Now is the time, advises the association, for pre-winter inspection and maintenance of unit heater installations.

While there are differences in construction of each manufacturer's make, certain basic maintenance and inspection procedures apply to almost any steam or hot water unit heater in use.

Regular inspection and maintenance is probably the most important factor in trouble-free and economical operation of unit heaters, says AMCA. An inspection every four months should be adequate under normal operating conditions. But if the atmosphere is extremely dirty, as with paper dust, more frequent inspections are needed. During the inspection, loose connections and excessive vibration should be corrected; the fan, outside of the motor, and the dirty heating elements should be cleaned according to the methods suggested in this article. Often such simple maintenance precautions can greatly extend the service life of the unit and preserve its operating efficiency.

Motors Maintenance

Since motors applied to unit heaters vary widely, the maintenance man is advised to follow the motor manufacturer's instructions provided with the unit. If the tags or instruction sheets are missing, contact either the motor manufacturer or the unit heater manufacturer for the information. Give them complete motor nameplate data.

Ball bearing motors are shipped with bearings packed in grease—sufficient lubrication for a year's operation. If the motor has a fitting for a pressure gun, be careful not to over-lubricate—the motor can be damaged if lubricant reaches the motor. With such pressure fittings, first remove the pressure relief plugs and allow the old grease to flow out. Refill with a high-temperature grease recommended by the manufacturer.

Sleeve bearing motors are normally equipped with wool-packed, oil-lubricated bearings. Before operating a new unit heater, fill the cups with a recommended type of oil and refill every 2,000 hours, To avoid possible motor damage, do not over-lubricate.

Clean Heating Elements

Heating elements should be cleaned at least once a year, and more often if the unit heater is operating in a dirty

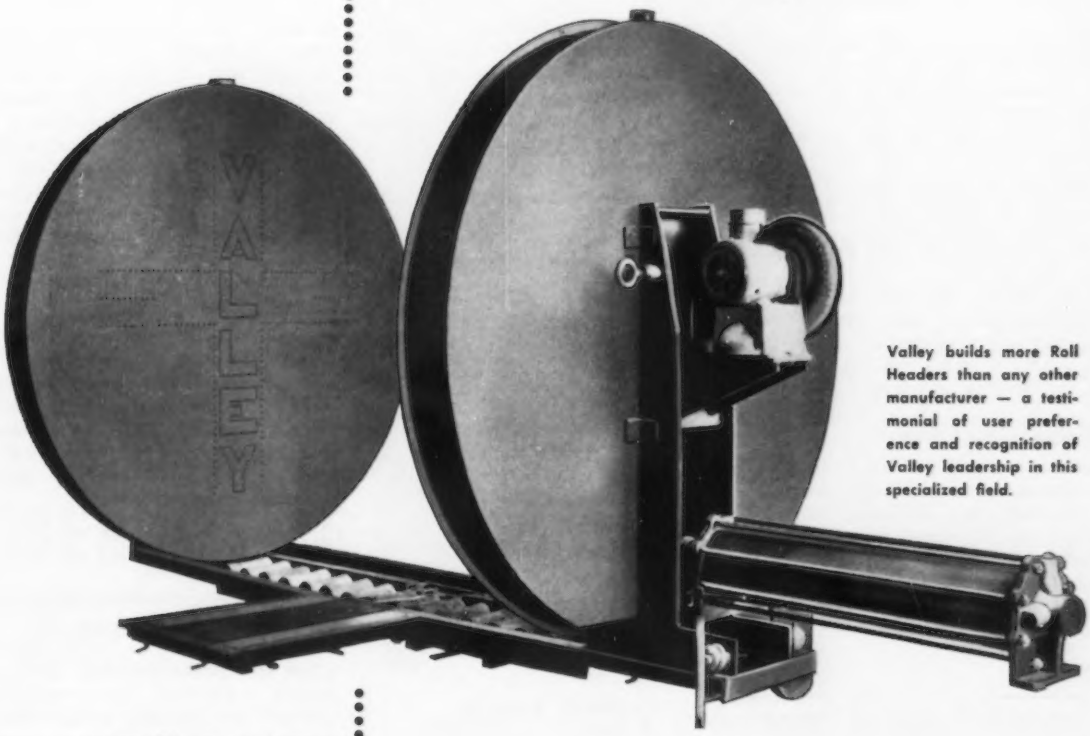
(Continued on page 32)

VALLEY

ROLL HEADERS

are cutting heading time

as much as 40%



Valley builds more Roll Headers than any other manufacturer — a testimonial of user preference and recognition of Valley leadership in this specialized field.

- **Portable or stationary units.**
- **Any desired size.**
- **Available with automatic operation for high production.**
- **Furnished with or without scale.**
- **Cold-steam heated or electrically heated heads.**

Substantial savings through cost reduction have resulted in mills using the Valley Roll Header. Heading time has been cut up to 40% . . . plus turning out a much more neatly packaged product. We have installations throughout the U.S.A., handling many different kinds of paper and different size rolls. Just drop us a line stating, "We're interested in Valley Roll Header savings."

VALLEY IRON WORKS CO., Appleton, Wisconsin

Canadian Representative: Pulp and Paper Mill Accessories Ltd.,
P. O. Box 903, Station "Q" Montreal 9, Quebec

The DRAPER Felt
DRAPER BROTHERS COMPANY
CANTON, MASS.

(Continued from page 30)

or corrosive atmosphere. Dirt can seriously reduce the heating capacity of the unit.

There are several simple and effective means of cleaning the elements. Dirt may be removed by brushing the fins on the side where the air enters the fin and then turning on the fan. (See Figure I).

A high pressure air hose can be used to blow out the element from the side where the air leaves it. (See Figure 2). With either of these methods, it would be best to place a bag over the unit to catch the dirt.

If the heating element is very dirty, remove the unit and spray with a mild alkali cleaning solution and rinse well with water. A steam gun can also be used for cleaning and rinsing.

Dirt Unbalances Fans

A dirty fan will get out of balance and cause noise. Excessive vibration due to inbalance may ultimately damage bearings, too. Fans must be cleaned at periodic intervals. During inspection, check to see that fans are in the proper position and that set screws are tight.

Internal Corrosion

Heating elements, return piping, and steam process equipment are subject to corrosive liquids formed by carbon dioxide, generated in the treatment of the boiler water combining with condensate to form carbonic acid. Oxygen present in steam accelerates this carbonic acid corrosion. Condensate should be tested regularly.

Units must be adequately vented to remove air. This is particularly important with high pressure steam system, such as in plants where steam is often generated for processing and where unit heaters operate at boiler pressures from 100 to 150 p.s.i. In such installations it is advisable to consider the use of reducing valves to lower the pressure below 10 p.s.i.

Make sure that the condensate drains quickly and completely. If some remains in the heating element, capacity is reduced, corrosion may occur, and there may be damage from water hammer. Also, condensate remaining in a unit heater not in use may freeze and break the unit.

Inspect Traps & Check Valves

AMCA recommends the use of traps, rather than check valves, which should be selected on the basis of the condensate to be handled . . . not on the basis of pipe size. In case of doubt, the manufacturer should be consulted. Periodically inspect this equipment for worn parts that leak or stick. Bellows which do not function may cause the unit to become air-bound. Jammed parts will not allow the condensate to drain quickly enough and cause damage.

Forced Hot Water Units

Hot water unit heaters should be equipped with air vent valves which will allow rapid and complete removal of air. The units should be drained completely if the system is shut down in freezing weather. It is recommended that such systems be sectionalized so that units may be changed without draining the entire system.

Blower Type Needs Special Attention

Fan shaft bearings should be inspected for end play, worn bearings and loose set screws. Lubricate sleeve bearings often enough to maintain oil at the proper level — at least every three months. Ball bearings should also be greased every three months.

If the unit is direct-connected, check the coupling for alignment and wear. Adjust V-belts for proper pully alignment. If using a multiple V-belt drive, replace all belts with a matched set if one becomes worn. Never replace one belt only. Check the motor hold down bolts and tighten, if loose, but make sure motor alignment is correct after tightening.

If the unit is equipped with an air filter, clean regularly to maintain air circulation and efficient heating capacity. (See Figure 3).

Regular, scheduled maintenance is not an expensive operation. But it can pay off large dividends in trouble-free and more economical operation.

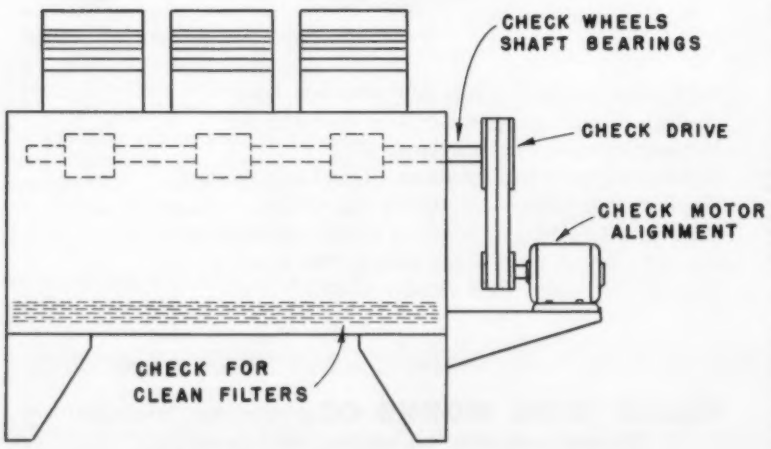


FIGURE 3—CHECKING DRIVE ELEMENTS. Blower type unit heater.

FIBERSIZE 85 guards pick strength

a special oxidized starch for offset papers

FIBERSIZE 85 offers unmatched uniformity that guards offset papers against reductions in base stock surface strength. It is quality controlled by special tests to obtain properties needed in size formulations. The resulting starch uniformity produces pick strengths that remain uniformly high. A worthwhile insurance in making offset grades from lightweight papers to heavyweight cover stocks.

FIBERSIZE 85 is also used to apply coatings at the size press. It produces sheets remarkably free of patterning. Protects against preferential absorption with its superior film characteristics. Provides strong pigment binding power of greater uniformity. Why not investigate this outstanding example of National's research with oxidized starches? National's nearest office is ready to work with you.

National
STARCH PRODUCTS INC.

270 Madison Avenue, New York 16 • 3641 So. Washtenaw Avenue, Chicago 32 • 735 Battery Street, San Francisco 11

NEW LITERATURE

ACCESSORIES AND SUPPLIES. (Catalogue 500) Includes specifications, part numbers and prices for more than 250 instrument parts and supplies. **Foxboro Co.,** 38 Neponset Ave., Foxboro, Mass.

BATTERY CHARGES. (Bulletin 203) Contains illustrated sales copy on these charges which can be supplied as integral parts of ASCO automatic transfer switch panels or as individual units, open or enclosed. **Automatic Switch Co.,** Florham Park, N. J.

CLIMATIZED VERTICAL HOLLOW SHAFT MOTORS. (Bulletin 2050) Provides motor specifications and a cutaway drawing of the motor. Also included are illustrations of installation and maintenance time-reducing features. **Louis Allis Co.,** 427 E. Stewart St., Milwaukee 1, Wis.

CYCLONE PRECIPATOR UNIT—98.5% PRECIPATION. (4p Reprint) Describes the installation and explains how each unit operates as well as how the system ties-in with the production process. **Buell Engineering Co., Inc.,** 70 Pine St., New York, N. Y.

GOLDEN-ANDERSON CUSHIONED VALVES IN ACTION. (Bulletin G-5) Provides schematics for various piping and valve arrangements for particular applications. **Golden-Anderson Valve Specialty Co.,** 1228 Ridge Ave., Pittsburgh 33, Pa.

GUARTEC FOR THE PAPER INDUSTRY. (12p Booklet) Tell how this gum can be used to improve printing paper quality while reducing mill costs through increased production. Also shows how this can be blended with starches as a wet and additive, or added dry to beater or chest. **General Mills, Inc., Special Commodities Div.,** 400 2nd Ave. So., Minneapolis 1, Minn.

"I know it's closed circuit TV—but every day about this time I pick up the Mickey Mouse Club."

LINK-BELT GEARED FLEXIBLE COUPLINGS. (Book 2775) Details pertinent application and selection data for their complete line of improved geared flexible couplings. **Link-Belt Co., Dept. PR,** Prudential Plaza, Chicago 1, Ill.

MAGNETIC LIQUID LEVEL GAGE. (Data Unit 306) Illustrates and describes the operation and gives technical data on this unit. **Jerguson Gage & Valve Co.,** 80 Adams St., Burlington, Mass.

MAINTENANCE GUIDE. (Booklet) Shows in pictures and cartoons a number of service hints for D9, D8 and D7 track-type tractors. **Caterpillar Tractor Co.,** 600 W. Washington.

NATION-WIDE SERVICE STATIONS. (Bulletin) Lists motor and generator service stations throughout the United States and Canada, together with company sales offices. **Marathon Electric Mfg. Corp.,** Wausau, Wis.

QUALITY CONTROL AID FOR CYLINDER MACHINE OPERATION. (Folder 45-1198) Describes and illustrates how their rolls function. This folder is the same size as the one prepared for fourdrinier operation. **Mount Hope Machinery Co.,** 15 5th St., Taunton, Mass.

PLIOLITE RESIN LATICES: TYPES AND PROPERTIES. (Technical Book Facts 57-136) Replaces Sheet 56-156 and includes Type 151. **Chemical Div., Goodyear Tire & Rubber Co., Inc.,** Akron 16, Ohio.

SUPERLOSE AND RAMALIN. (12p Brochure) Describes the physical and chemical properties possessed by these two principal components of potato starch. **Colloid Dept., Stein Hall & Co., Inc.,** 285 Madison Ave., New York 17, N. Y.

POLYETHYLENE PLASTIC PIPE. (Bulletin 29) Contains application information, operating pressure charts, tables and corrosion resistance data. **National Tube Div., U. S. Steel Corp.,** 525 William Penn Pl., Pittsburgh 30, Pa.

SPROUT-WALDRON LABORATORY FLAT SCREEN. (Bulletin 189) Gives complete description and specifications. Also includes dimensions and illustrations of sample layouts for a screening installation. **Pulp & Paper Mill Div., Sprout, Waldron & Co., Inc.,** Muncy, Pa.

THE HANDBOOK OF POWERED INDUSTRIAL TRUCKS. (96p Book) Provides sections on industrial truck applications; cost savings through industrial truck handling; planning for the selection of industrial trucks; industrial truck engineering data, and industrial trucks and the future. Price $5.00 **Industrial Truck Assn.,** 9th and F Sts., Washington 4, D. C.

V-BELTS. (Booklet S-51106) Tells the story of the machines and processes used in the production of V-belts. **Dept. 794, Goodyear Tire & Rubber Co.,** Akron 16, Ohio.

VIC-EASY. (Bulletin) Gives details of this system and lists applications for which the method is suitable. **Victaulic Co. of America,** Box 509, Elizabeth, N. J.

The *"Eternal Triangle"* Keeps Business Growing

The ***Triangle*** pictured above represents the "three essentials for living" that provide an ever-expanding market for *new* Huyck felts.

To meet the increasing felt demands of these important industries, Huyck applies the ***Triangle*** of research... manufacturing... and service engineering to create *new* treatments... *new* production techniques... and *new* aids to papermakers—*to assure*...

1. The ***Triangle*** of longer felt life... better drainage... and superior finish—*to produce*...

2. The ***Triangle*** of top quality paper... paperboard... and textile products—*to provide*...

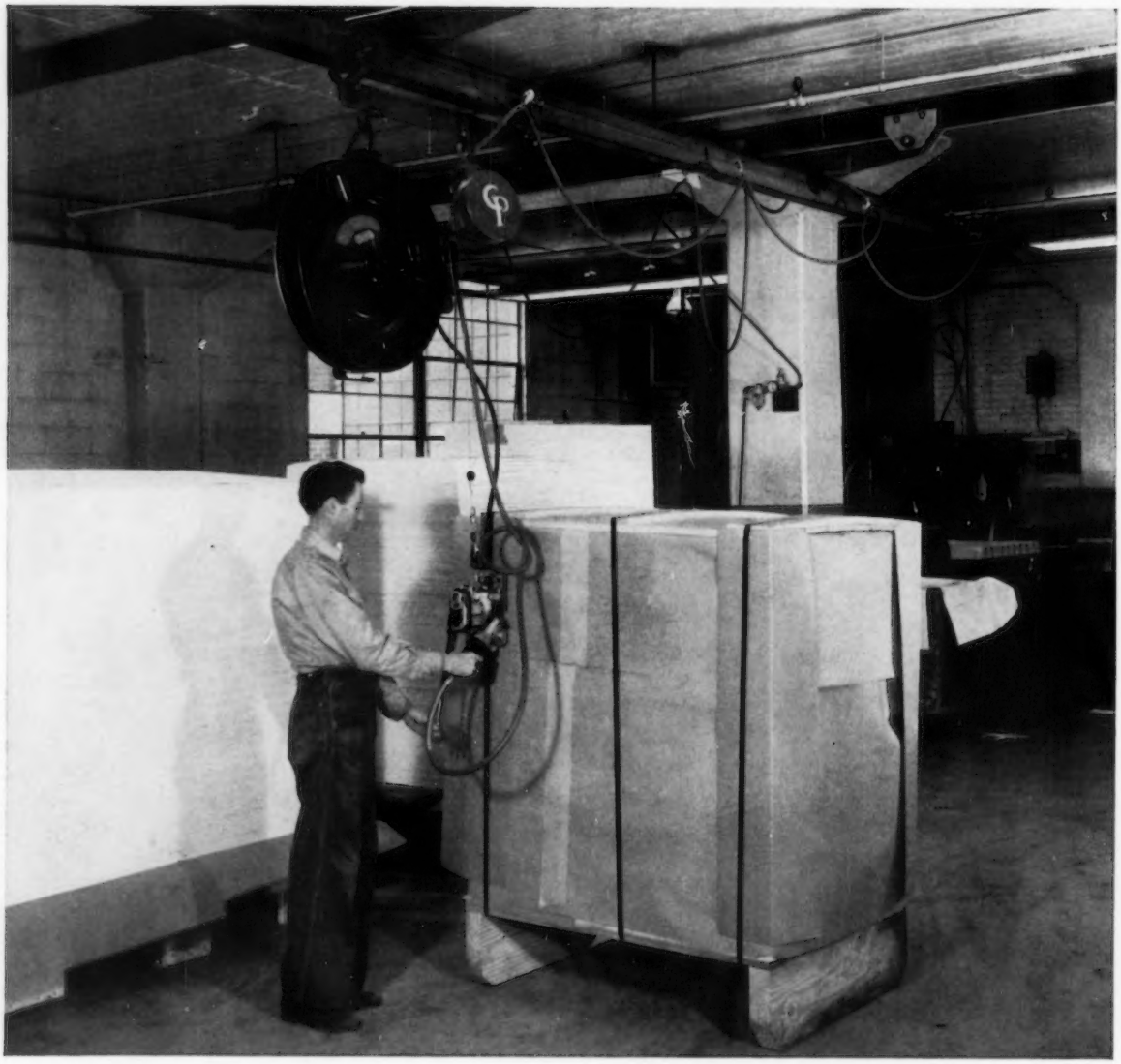
3. The ***Triangle*** of more satisfied customers... well-paid employees... and a just return for stockholders.

KENWOOD TEXTILE PRODUCTS

F. C. Huyck & Sons,
Rensselaer, N. Y.; Aliceville, Ala.;
Peterborough, N. H.; Cavendish, Vt.;
In Canada: Kenwood Mills Ltd.,
Arnprior, Ontario

NEW HUYCK FELTS ★ INDUSTRIAL FABRICS

FIRST IN QUALITY • FIRST IN SERVICE SINCE 1870



Fast new way to strap paper skids

Strapping paper skids is fast and easy with a setup like this. The bridge crane gives mobility to the strapping equipment, and obstruction-free working space on the floor. Signode's new AP-34 air-powered strapping machine applies strap almost effortlessly, in seconds. This Signode design setup makes skid strapping a much more efficient and easy operation. It saves important time and, in addition, frees valuable floor space. A Signode field engineer will be glad to work with you to develop complete strapping stations in your plant, tailored to your needs. Let him help you save time and money now. Write:

SIGNODE STEEL STRAPPING CO.

2677 No. Western Avenue, Chicago 47, Illinois

Offices Coast to Coast. Foreign Subsidiaries and Distributors World-wide
In Canada: Canadian Steel Strapping Co., Ltd., Montreal • Toronto

How, What, Where and Why of Pulp Stones

Different types of stones are compared, then the mounting, operating and sharpening of them are discussed in an authoritative manner.

Dr. K. H. Klemm

Manager, München Dachauer Papier Fabriken
Munich, Germany

English text by G. P. Chinn

Originally, natural sandstones were used for wood grinding. As the grinder design developed towards higher capacities through increased load, width and surface speeds, it became more and more difficult to find natural stone suitable for the new operating conditions. In Europe they were replaced by artificial sandstones (1), while in North America, vitrified artificial stones (2) were developed which in recent years, have also received attention in Europe.

With the introduction of the artificial pulpstones it became possible to select the stone composition and, therefore, to provide a special stone structure for each groundwood quality. To date, however, the amount known about the influence of stone structure on groundwood quality is still very small. While the grit size and abrasive type have considerable influence on the quality of the groundwood, the hardness of the bond and the ratio between the amount of bond and grits also play a part. Table I presents a survey of the chief stone qualities and the recommendations given by the manufacturers for their use. These recommendations, however, can only indicate the approximate direction to go as there are no definite limits for the use of the different types.

The influence of grit size may be characterized by not being limited to a certain groundwood quality but, with each groundwood quality, an optimum for the grit size exists which is best suited to maintain the quality wanted during a longer interval between sharpenings. The problem of the influence of grit size (3), therefore, is very complex, as the depth of sharpening and the magnitude of the Initial Grinding Factor also influence the results. As shown earlier in the discussion on the fundamentals of the grinding process, by varying the grit size and depth of sharpening at the same Initial Grinding Factor, it is possible to:

1—Obtain the desired fineness of the groundwood during the primary process and reduce refining dur-

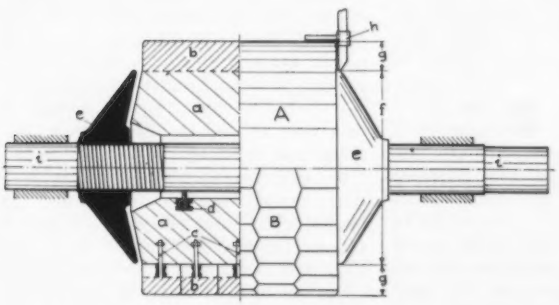


FIGURE 1A and 1B — CONSTRUCTION OF THE GRINDER STONES.

A—Cement bond stone; B—Vitrified Bond Stone (Norton Co.); a—Reinforced concrete center; b—Abrasive layer; c—Segment screws; d—Adjustment screws; e—Stone flanges; f—Diameter of the stone flanges; g—Height of the stone above the flanges; h—Device for measuring g; i—Grinder shaft.

FIGURE 2—VITRIFIED BOND STONE

TABLE I—SURVEY OF EQUIVALENT PULPSTONE QUALITIES

Groundwood End Use	Groundwood Class[1]	Stone Quality as Recommended by the Manufacturers — Cement Bond Stones — Herkules	Ideal	Nörrona[3]	Staco[2]	Vitrified Bond Stones — Norton[3]	Carborundum[4]
Extremely fine, for paper and "postcard" board	I	G	XV	Q.V. 30 T/S 6	00	80-100	C82c4 M7 VGC C80a1 M7 VGC C78c8 M7 VGC
Super fine, for paper and "postcard" board	I	Aooo	XIV	Q.V. 26 T/S 5½	00½	80-100	as above
Very fine, for paper and "postcard" board	II	Aooo	XII	Q.V. 24 T/S 5	0	70-80	C72c4 M7 VGC C70a1 M7 VGC C703 M7 VGC
Fine, for paper, "postcard" board and wood felts	III	Aoo	VI	Q.V. 20 T/S 4½	0½	60-80	C68c8 M7 VGC C603 M7 VGC
Normal, for paper, "postcard" board and wood felts	IV, V	Ao, A	IV	Q.V. 18 T/S 4, 3½	A, S, AS	54-70	C63c6 M7 VGC C60a1 M7 VGC C543 M7 VGC C49a1 M7 VGC
Free, for board, wood felts and very fine steamed groundwood for board and leatherboard	VI	AI	III	T/S 3	½	36-54	C42b1 P5 VGC C463 M7 VGC
Very free, for board, wood felts and fine steamed groundwood for board and leatherboard	VII	AII	I	Q.V. 14 T/S 2½	I	36-54	
Free steamed groundwood for board and leatherboard		B	Ia, Ib	T/S 2	1½	24-36	BC27b2 Q7 VGC
Very free steamed groundwood for board and leatherboard		C		T/S 1½		24-36	
Very coarse groundwood and steamed groundwood for building board	VIII	D, E, F	Ic, Id	T/S I T/S ½	2, 3	14-24	BC22b2 Q5 VGC

[1] For white groundwood only according to the proposal of Brecht, Merkblott V1/2 Verein der Zellstoff—und Papier-Chemiker und-Ingenieure.
[2] With the Staco stones: A indicates silicon carbide grits; S indicates quartz grits; AS indicates a mixture of the two grits.
[3] In this table, only the grit size is indicated, e.g. the underlined number in a stone 37C *601* N7V. These pulpstones are available in either CRYSTOLON (silicon carbide) or ALUNDUM (aluminum oxide) abrasive made with special bonds. The exact compositions are best determined by consulting Norton Co.
[4] In this table, only the grit size is indicated, e.g. the underlined number in a stone A *68c8* M7VR. Carborundum qualities are given: all grades are also available in Aloxite.
[5] With respect to Norröna stones, Q.V. = cement bond; T/S = special quality for steamed groundwood (also suited for normal groundwood).

ing the secondary process to a minimum.

2—Obtain a relatively coarse defiberation in the primary process and the desired degree of fineness by a heavy refining action in the secondary process.

If grits which pass a No. 54 wire mesh and are retained on a No. 70 are considered to be the size best suited for newsprint groundwood production at normal loads, then finer grits and greater depths of sharpening result in the conditions indicated by **(1)** above. The desired freeness can be maintained for a long time at relatively low energy consumption. Coarser grits and smaller depth of sharpening would give conditions corresponding to **(2)**. A higher quality groundwood results but it is more difficult to maintain the desired freeness and quality fluctuations are greater. Using the terms of fiber technology, the poorer quality from **(1)** is related to the fine but short, straight fibers and flour-like fines. The stronger pulp from **(2)** results from the well fibrilized fibers and fibrilplasma type fines. There are no definite data available to indicate the influence of the bond hardness or stone density on the groundwood quality.

Artificial Sandstones

Artificial sandstones are built up from a layer of quartz or silicon carbide grits of a definite size bonded together by cement around a reinforced concrete core (Figure 1A). The grit size is not given out by the manufacturers. In use, stones are exposed to very high stresses resulting from both the temperature differences within the stone and the high surface speed with its related centrifugal forces. The former would be relatively unimportant if the temperature changed equally over the whole crosssection. However, the temperature increase or decrease starts from the periphery of the stone and proceeds only slowly towards the core. Temperature differences as low as 18-20°F. are dangerous. As cement bond stones are designed to be used down to the flanges, no reinforcing can be used above this point and the outer 6 inches of a 60-inch stone and 7 inches of a 71-inch diameter stone are without reinforcing. This depth is only 2½ inches with vitrified artificial stones. From this, it can be seen that increasing the temperature at start-ups and decreasing it at shutdowns must be done very carefully with cement bond stones. It must be realized that it is not the actual temperature but the temperature difference which is important. Naturally, large temperature differences are more easily caused at high temperatures.

Vitrified Artificial Stones

The vitrified bond stones (4) (5), because of their construction principle, are less subject to temperature breaks. As can be seen from Figure 1B, the abrasive layer consists of segments (a) which are connected by heavy screws to the reinforced center of the stone. The higher strength of these stones are primarily related to the abrasive segments not being so sensitive to temperature differences and to the reinforcement which reaches to within 2½ inches of the stone periphery. Temperature breaks can occur if the stones are subjected to too high temperature differences but then, it is usually restricted to a single segment and, as each is individually anchored to the center (b), the others are not affected. Figure 2 shows a vitrified stone.

Vitrified bond stones are manufactured in a practically unlimited combination of grit types, sizes, stone hardness, density and kind of bond. The structure of the stone is indicated by letters and numbers according to the

C	68	c8	M7	VR	Carborundum Co.
38A	*56*	*4*	*N7*	*V*	Norton Co.
1	**2**	**3**	**4**	**5**	(groups numbered for discussion purposes)

The first group indicates the material of the grits which presently consists of silicon carbide or aluminum oxide. The trade names are:

Silicon Carbide—Crystolon* (C, *37C*, 39C)—Norton Co.
Carborundum (*C*, CC)—Carborundum Co.
Aluminum Oxide—Alundum (A, 32A, *38A*, 19A, 57A 15A)—Norton Co.
Aloxite (*A*, AA)—Carborundum Co.

* The boldface data indicate the grade most commonly used.

The second group marks the grit size, indicating the wire mesh through which the grits can pass while being retained on the next finer wire (according to the following spacings):

Coarse					Medium					Fine	
16,	20,	24,	30,	36,	**46,**	**54,**	**60,**	**70,**	80,	90,	100

standards of the Grinding Wheel Institute of America as shown in the examples shown above.

During the manufacture of the grits, all sizes are produced. The manufacturers, therefore, prefer to build stones from grit size combinations rather than from a single grit size. The combination of grits also give higher bonding strengths. With the stones of Norton Co., each number in the third group indicates a certain grit combination which is not given out. However, the figure in the second group is equivalent to the prevailing grit size. With the Carborundum Co., the figure of the second group indicates the average grit size and an additional letter is used to show the differences in grit size; (a)—coarsest grit is one interval coarser, (b)—two intervals coarser, and (c)—three intervals coarser than the average grit size given. The number in the third group is then the number of different grits used. Stones identified by the figures 1 to 3 contain three different grit sizes and by figures 4 and above, 4 different grit sizes.

The fourth group shows the hardness and density of the abrasive layer. The letters indicate the hardness according to the following:

Soft			Normal					Hard	
I,	K,	L,	*M*,	*N*,	O,	P,	Q,	R,	S

The hardness is related to the ratio of grits to bond and at the hardness "N", this ratio is about 5.5:1 (by weight). The number given in this group specifies the density:

Dense							Open
5,	*6*,	*7*,	8,	9,	10,	11,	12

The fifth group indicates the kind of bond. Until now, only the vitrified bond has been used. The types are identified by:

V, G, VG, VP

The letter "P" always indicates artificially effected porosity of the stone by the addition of special chemicals during manufacture.

Comparison of Different Pulpstone Types

While there is no distinct difference between the total quantity of wood ground during the lifetime (at any groundwood quality) of different cement bond stones or different vitrified bond stones, a pronounced difference exists between the two groups. Table II shows the volume of abrasive available in a one foot width of a 60 and 71 inch stone. From this it can be seen that cement bond stones have more abrasive material available than vitrified bond stones. However, this is more than compensated by the fact that more wood can be ground per cubic inch of abrasive with the vitrified bond stones. This quantity is very much dependent upon the wood species and the wood condition but, with the dry European wood, about 0.9-1.64 cords are ground per cubic inch of the abrasive for vitrified bond stones against 0.16-0.26 cords for the cement bond stones. The lifetime of the former, therefore, is 2 to 2½ times the greater.

A comparison between the quality of the groundwood produced on the cement and vitrified bond stones is difficult although, undoubtedly, the effect of each type is quite different. (See Table III). As a rough criterion, the vitrified bond stone has a more pronounced cutting action resulting in a more uniform but lower strength groundwood. Cement bond stones must be sharpened more often. The average quality is, therefore, much less uniform

TABLE II—COMPARISON OF VOLUME OF ABRASIVE AVAILABLE IN CEMENT AND VITRIFIED BOND STONES

Stone Diameter	60"	71"
Thickness of the Abrasive Layer		
Cement Bond Stone—inches	5.9	6.9
Vitrified Bond Stone—inches	2.5	2.5
Volume of Abrasive per Foot Width		
Cement Bond Stone—cubic inches	11.800	16.500
Vitrified Bond Stones—cubic inches	5.500	6.600

TABLE III—QUALITY OF GROUNDWOOD PRODUCED FROM DIFFERENT STONE TYPES
(European Spruce)

Stone Type	Cement Bond		Vitrified Bond		Average	
Wood Moisture %	18-22	30-35	18-22	30-35	18-22	30-35
Production tons (o.d.)/24 hr.	30.9	28.1	34.2	33.1	32	30.3
Specific Energy Consumption h.p. day/ton (o.d.)	48	53	43	44.5	46	48.5
Freeness (Canadian Standard)	135	140	190	168	160	155
Fiber Classification*						
Splinters %	4.2	5.0	2.1	2.2	2.9	3.3
Long Fibers %	17.5	24.3	16.9	23.0	17.2	23.5
Short Fibers %	27.0	24.0	31.5	31.3	29.7	28.4
Fines %	51.3	46.7	49.5	43.5	50.2	44.8
Strength Properties*						
Initial Wet Strength g	36	50	31	41	33	45
Bulk g/cm³	0.398	0.373	0.375	0.338	0.384	0.352
Breaking Length m	2210	2710	1810	2200	1970	2600
Flexibility Test	274	1308	34	16	130	561

* German Standard Methods

TABLE IV—PULP QUALITY AND TYPE OF STONE

Groundwood Mixture from % Vitrified Bond Stones	% Cement Bond Stones	Number of Freeness Measurements outside the Desired Limits — %	+ %	+ % —
0	100	60	5	65
15	85	30	15	45
25	75	10	20	30
45	55	0	15	15

although the grits act to give less cutting and more fibrillation with correspondingly higher strengths.

To help characterize the uniformity of pulp as dependent upon the type of pulpstones, the observations in Table IV made in a mill during the introduction of more and more stones with vitrified bond are interesting. The differences are particularly apparent when grinding dry wood, becoming less and less visible as the wood moisture content increases. This may be the explanation why the vitrified bond stones are preferred in those countries where floated wood is available (North America and Scandinavia) while more cement bond stones are used in those countries where the mills operate mostly on dry wood (Central Europe).

Mounting Pulpstones

Because of the great weight of the stones (7.5 tons for a 60-inch diameter stone) and the centrifugal forces and loading pressures which act during operation, the stones must be mounted on the shaft with great care. As can be seen from Figure 3, the stone is mounted on the shaft between two flanges which are screwed into place. The two ends of the shaft are threaded in opposite directions and so provide a tightening action with the turning of the pulpstone. Before the flanges are set in place, however, the stone must be adjusted to be exactly in parallel with the shaft.

Figure 3 shows the equipment used for mounting the stone. The shaft (a) with the loose stone (b) and the loose flanges (c) is placed in the bearings (d) which are fixed on a strong angle-iron frame (e). The weight of the stone is taken by the crane using a rope sling (f) and the stone is aligned with wooden wedges (g). With vitrified bond stones this operation is much easier as they are constructed with adjustable setscrews which are used to position the stones on the shaft (see Figure 4D). Once the stone is properly aligned, the flanges can be tightened. To insure a bond between the stone (h) and the flanges, a plywood or hardboard washer is inserted between them. Instead of using this washer, the bond is often achieved by filling this space with cement, molten sulphur or lead in which case it is not necessary to make a final shaping of the stone sides to fit the individual flange. When this method is used, the flanges are screwed to within about ⅜-inches of the stone. The space between the stone and shaft must first have been plugged (e.g. with wet lapped groundwood). A sealing rope (k) encloses the space between the stone and flange which is then filled with the material selected. Sulphur or lead are recommended because these can be melted when the stone is worn out and the flanges removed much more easily. In all cases the thread of the shaft must first be lubricated (e.g. aluminum powder — vaseline; graphite — 600 W oil), bearing in mind that it will be up to four years before these flanges are loosened again.

In recent years the flange design has been improved to make stone mounting easier. Figure 4 shows the conventional construction A, the Miag flexible flange (B), the Waterous inverted flange (C) and self-aligning flange (D) and a self-aligning attachment as developed by the Carborundum Company (E).

Operating the Pulpstone

Setting the stones in the grinders is different with each grinder type and the recommendations of the individual manufacturers should be followed. If the new stone has been prepared beforehand, a stone change would normally require 8 to 12 hours. Before starting up a new stone, the surface should be trued by using the sharpening lathe and special burrs. Because of the danger of temperature breaks, the start-up of a new stone must be done very carefully. In raising the temperature from about 95°F. to that used in normal operations, the increase should not be more than 2°F. per hour with cement bond and 5°F. per hour with vitrified bond stones. The load should also be increased slowly, from one half to full load in 24 hours respectively for vitrified and cement bond stones. Similar care should be taken after shutdowns of more than 32 hours while with shorter shutdowns the rate of temperature rise can be doubled. To avoid stone breaks in operation, it is most important to prevent a sudden cooling of the stone surface (e.g. use of cold water in the showers or for washing a hot stone). A high percentage of the stone breaks is usually due to careless operation.

All grinders must be equipped with stone sharpening devices. As was discussed earlier in the theory of the grinding process, the pulp produced in the grinding zone is carried between the wood and the stone to the grinder pit. Because of the directional force of the high stone surface speed, only a very small percentage of the groundwood falls out over the sides. The stone surface must, therefore, be suited for

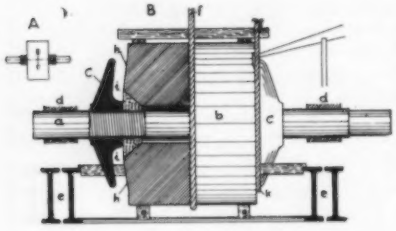


FIGURE 3 — ASSEMBLING THE STONE AND SHAFT

A—Principle of Assembling; B—Device for assembling. a—Grinder shaft; b—Stone; c—Flanges; d—Bearings; e—Support for bearings; f—Crane rope; g—Wood wedges for adjustment; h—Side of stone; i—Sealing between stone and flange; k—Rope for sealing at the lower flange edge.

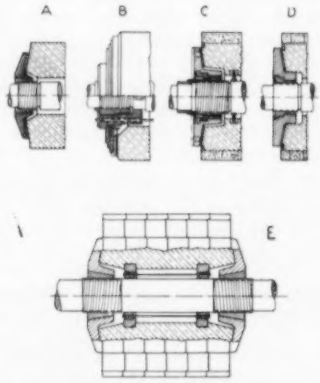


FIGURE 4 — CONSTRUCTION OF THE FLANGES

A—Conventional construction; B—Adjustable construction of Miag; C—The Waterous inverted flange; D—Same as C but with device for self centering; E—Centering device with conventional flange construction.

defibering the wood, refining the loosened fibers and carrying the stock to the pit. The stone surface must be prepared by sharpening in such a way as to create a special structure which should guarantee that these complex requirements are fulfilled. The necessity of keeping this balance is the main reason why the sharpening is so important and explains the difficulties related to it, especially as the stone surface is subjected to continuous wear.

Sharpening Lathe and Its Operation

All devices for the sharpening of pulpstones are based on the same principle. A sharpening burr which represents the negative of the desired stone surface pattern is set in a mechanism such that it can rotate and is pressed against the revolving pulpstone. At the same time it is moved across the width of the stone. The principle of the sharpening devices can be seen from Figure 5A. In the example shown, the motor (a), through the spindle (c) moves the sharpening lathe (b). The lathe is supported by the two shafts (d). Some lathes are driven by a mechanical connection to the grinder shaft but most modern designs use hydraulic or oil pressure activated pistons. The speed of the movement of the sharpening lathe across the stone is important. The burr moves like a spiral on the stone surface and practical experience has shown that the best sharpening effect can be expected if the spirals overlap not more than one quarter of the width of the sharpening burr. The direction of movement should always be the same and it is advisable to indicate this by an arrow on the grinder housing. If

B is the width of the stone (inches)
b is the width of the burr (inches)
n is the shaft speed (r.p.m.)

the time for the movement of the burr across the stone (t_v) can be calculated from:

$$t_v = \frac{60 \quad B}{0.75 n \; b} \text{ sec.} \quad \ldots\ldots\ldots (1)$$

For a stone 52 inches wide and turning at 245 r.p.m., this works out to be about 4½ seconds.

Figure 5C shows the principle of pressing the burr against the stone. This example incorporates a device developed by Brecht (6) which indicates the applied pressure. The hand-operated spindle (e) acts on the cylinder (f) at the end of which the burr (g) is attached. The pressure acting when the burr is forced against the stone (h) is transferred by the ring (i) to the diaphragm (k) which covers the oil-filled chamber (l) and is thus indicated by the pressure gauge (m). Modern lathes have been designed to give better control of the sharpening. Brecht, in conjunction with J. M. Voith (6), developed a sharpening lathe which controls and measures the pressure between the burr and stone. Those of the Waterous Co. are equipped with micrometer attachments to measure the advance of the burr towards the stone. None of these improvements, however, have succeeded in providing complete control of the sharpening and the effect obtained from this very important operation, in practice, is very much dependent on the skill of the operators.

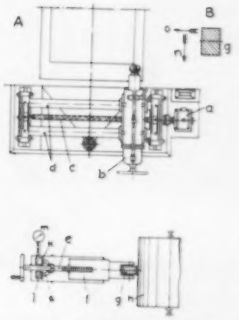


FIGURE 5—THE SHARPENING LATHE

A—Working principle; B—Direction of sharpenings; C—Device for measuring sharpening pressure. a—Drive; b—Support for burr; c—Spindle for drive; d—Shafts for guiding sharpening device; e—Spindle for burr; f—Cylinder for the burr; g—Sharpening burr; h—Grinder stone; i—Pressure ring; k—Diaphragm; l—Oil chamber; m—Gauge indicating sharpening pressure.

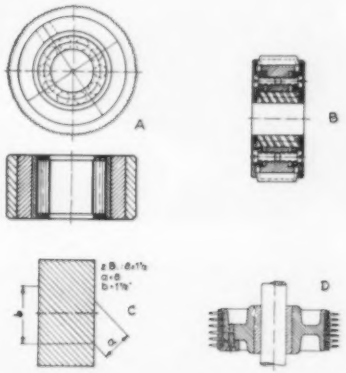


FIGURE 6 — MOST IMPORTANT SHARPENING BURRS

A—Spiral burr with roller bearings; B—Knife burr with roller bearings; C—Definition of the spiral burr; D—Needle burr with babbit bearing.

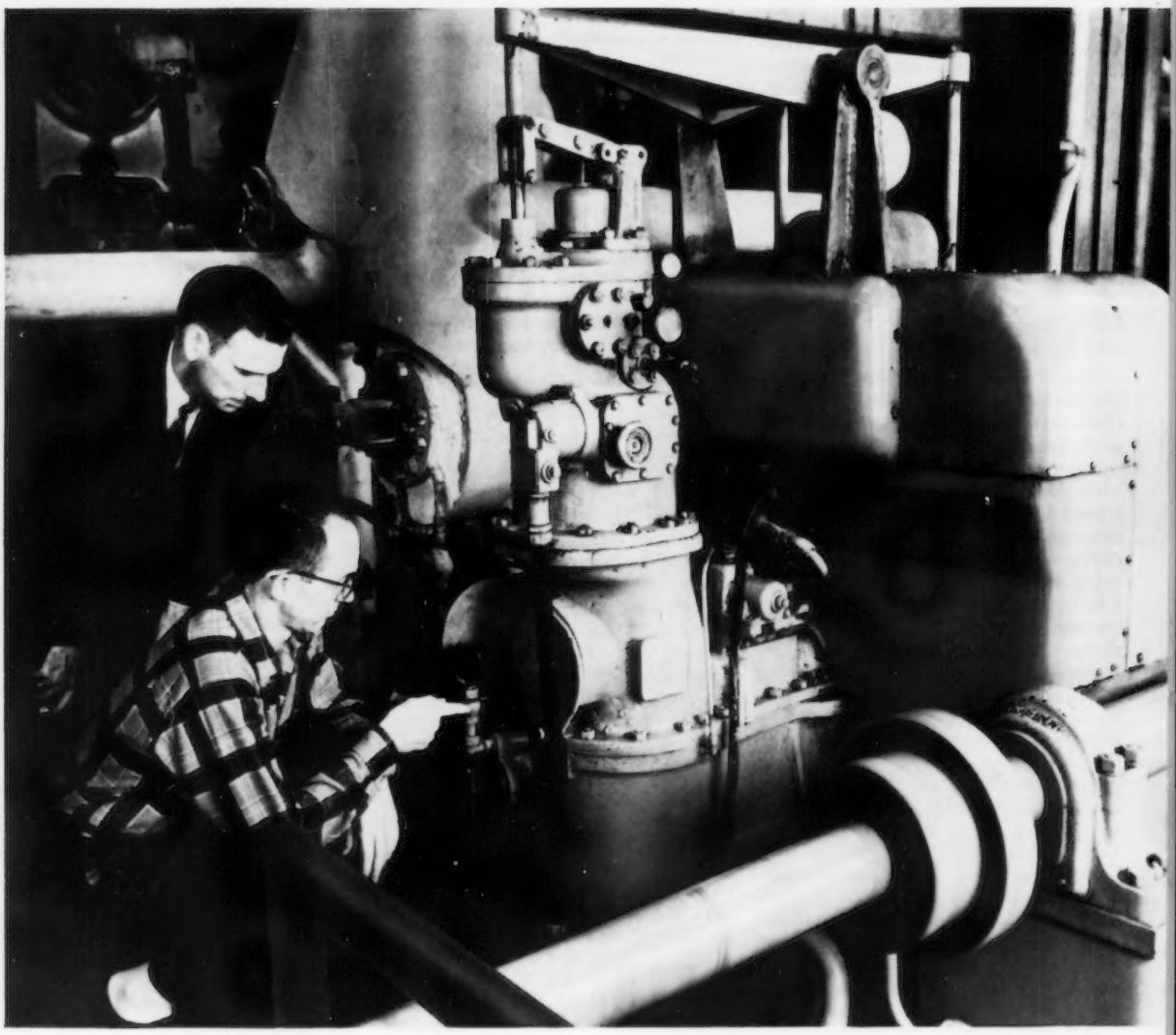
Types of Sharpening Burrs

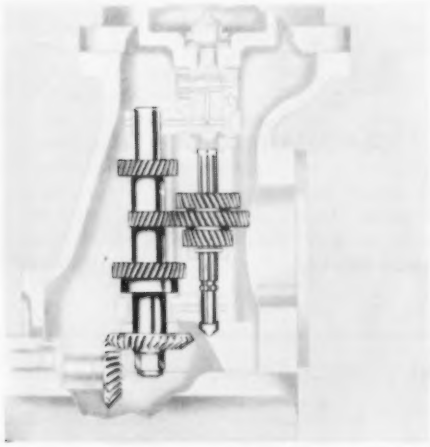
For some time the opinion was held that it is possible to influence the quality of the groundwood considerably by the choice of the sharpening burr. Practical experience has shown (7), that it is possible to make good quality groundwood with any burr provided the depth of sharpening has the correct ratio to the production rate. It is known that compensation can be made for certain wood quality fluctuations by changing the kind of burr. However, this may be related to the fact that, by changing the burr, and using the same sharpening technique, the average depth of sharpening is changed. Without doubt, this same compensation can be achieved by using the same burr but changing the sharpening technique. It is probably easier and better to change the burr than to ask the operators to change their technique.

The most important types of burrs are shown in Figure 6. As the burrs are subject to heavy wear and should not be used more than three times, all modern burrs are designed such that only the outer cutting ring has to be changed. As shown in the illustration the interchangeable ring is mounted on an anti-friction or roller bearing. The latter is recommended. With the spiral burrs, especially favored in North America, the whole ring has to be removed and replaced by a new one. The various types of spiral burrs are differentiated by numbers which represent the num-

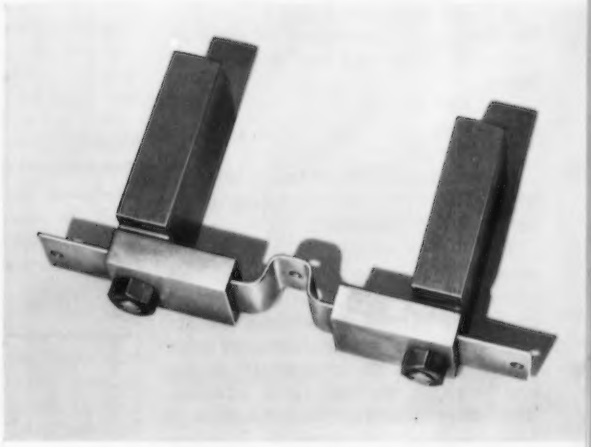
TABLE V—MOST COMMONLY USED NEEDLE BURRS

Grade of Groundwood	Needle Diameter Top (mm.)	Needle Diameter Bottom (mm.)	Needle Length (mm.)	Diagonal Distance between Needles (mm.)
Fine	2.5	2.35	15	3.5 x 4.0
Normal	3.0	2.8	15	4.5 x 5.5
Coarse	3.6	3.4	17	5.0 x 7.0

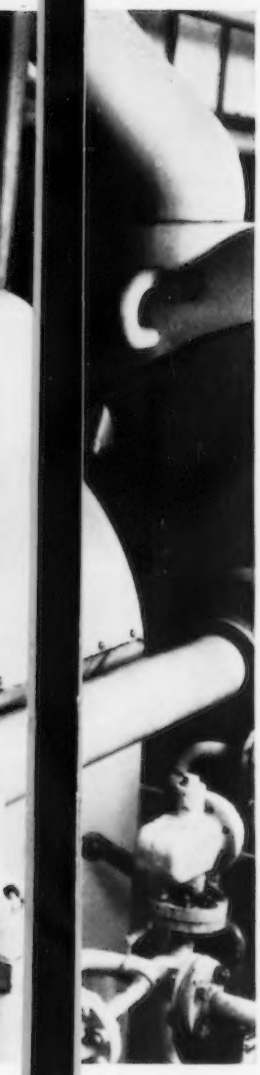




Unique gear shift permits changing ratio of governor speed to turbine speed. Provides top accuracy for each speed range: high, medium and low.



Frictionless speed sensing element reduces governor dead band to an absolute minimum. Design simplicity assures long-term accuracy and maintenance-free operation.



New governor development gives greater accuracy... more uniform paper

Proved by 40-page certified report available to you now

Because of the demand for closer control of paper machine speed, Westinghouse now offers a unique new device... a 3-speed transmission that permits changing the ratio of governor speed to turbine speed. It's a 3 in 1 governor providing high-speed accuracy at lower speeds.

Performance tests were made at St. Marys Kraft Corporation, St. Marys, Georgia, and Canadian International Paper Company, La Tuque, Canada. Oscillograph charts of the operating tests, covering a 10 to 1 speed range, clearly show that the Westinghouse 3-speed governor provides far closer accuracy than paper industry requirements which now state:

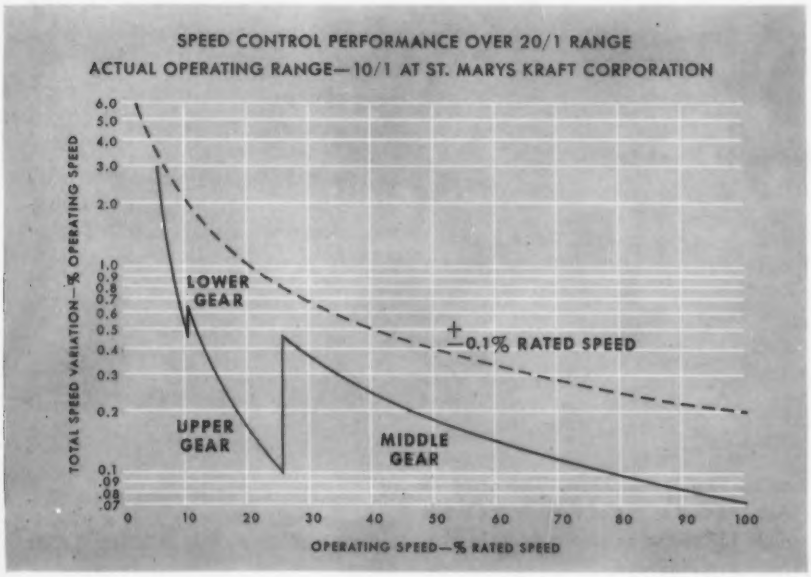
"The turbine speed will not vary from any set speed more than plus or minus 1/10 of 1% of maximum rated speed over a 10 to 1 speed range, provided the combined effect of changes in load, initial steam pressure, superheat, and back pressure do not change the steam flow more than 20% of rated steam flow in 4 seconds."

Write today for your copy of the certified report of operating tests to Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa.

J-50594-A

New Westinghouse turbine drive operating paper machine at St. Marys Kraft Corporation, St. Marys, Georgia. Pointing to the gear shift governor is W. G. Gray, Jr., assistant plant manager in charge of production, shown with D. H. Barnes, Westinghouse sales engineer.

YOU CAN BE SURE... IF IT'S Westinghouse



Operating test results of new Westinghouse 3-speed turbine governor on paper machine at St. Marys Kraft Corporation, St. Marys, Georgia. Each gear speed range curve is far below the variation permitted by industry specifications.

ber of furrows to the inch and the slope of the furrows in inches according to Figure 6C. Those commonly used for newsprint quality groundwood have 8-12 furrows to the inch; the lower numbers are more suited for dry wood and the higher ones, for wood having a high moisture content. The slope is usually 1¼ and 1½ inches.

In Europe, in addition to the spiral, needle (Figure 6D) and knife (Figure 6B) burrs are also used. With these, the outer ring is not changed when the burr is worn out, only the needles or knives are replaced. The various types of needle burrs are differentiated by numbers giving the diagonal distance between the needles and the diameter of the top and bottom of these conical shaped needles. Those most commonly used are given in Table V.

The knife burrs are indicated by the angle of slope (12, 28 and 40°) and their distance apart (from 1.9 to 6.2 mm.). They are less commonly used than the needle and spiral types.

Despite the very different sharpening patterns obtained with the various burr types, experience has indicated that there is no pulp quality advantage related to any one kind. It is recommended, however, that only one type be used in one mill and that some flexibility be maintained by two or three different grades of this basic type. Each stone should have its own burr and any change in the grade of burr used should be restricted to special conditions which arise.

Stone sharpening has been discussed in detail because the sharpening is extremely important to the groundwood quality. The practical use of the sharpening equipment will be discussed further later.

Bibliography

(1) Kirchner, E. Comparison of the Results with Natural and Artificial Pulpstones. *Papierfabrikant* 42, no. 38:3628 (1911).

(2) Greenwood, W. W. Artificial Pulpstone. *Paper Trade JOURNAL* 80, no. 6:169 (1925). *Pulp Paper Mag. Canada* 23, no. 8:193 (1925).

Greenwood, W. W. The Construction of a Segmental Pulpstone and Its Operation. *Pulp Paper Mag. Canada* 25, no. 3:101 (1927).

(3) Walsh, E. P. The Effect of Pulpstone Grit Distribution on Groundwood Quality Control. *Pulp Paper Mag. Canada* 52, no. 4:86 (1951).

(4) Perry, J. H. The Modern Artificial Pulpstones. *Paper Trade JOURNAL* 121, no. 18:31 (1945).

(5) Barrett, W. W. Pulp Stones and Their Use. *Paper Mill News* 72, no. 13:55 (1949).

(6) Brecht, W. Developments. *Das Papier* 2, no. 23/24:437 (1948).

(7) Klemm, K. H. The Interpretation of Groundwood Production by Fibre Technology. *Pulp Paper Mag. Canada* 56, no. 12:178 (1955).

NEWS OF CONVERTERS

Container Corp. Opens Box Plant at Renton

Container Corp. of America formally opened its new folding carton plant at Renton, near Seattle, Wash. on October 9. The new plant—representing an investment of nearly $1 million—was "introduced" to civic, business and community leaders at an open house and luncheon with top company executives as hosts.

Container Corp.'s Renton plant produces folding cartons from paperboard supplied by the company mills at Tacoma, Los Angeles, and Santa Clara. The new facility is part of the company's integrated organization that provides packaging services on a nationwide scale. This network of plants and mills now includes production facilities in 44 cities and 23 states.

The equipment used at Renton to manufacture folding cartons includes the most modern types of multicolor printing presses, die cutting presses, waxing machines, and high speed fold ing and gluing units.

A special feature of the Renton plant is the vacuum disposal system that handles paper waste from the cutting machines. This system delivers the scrap to the baling machines. The scrap is then shipped to one of Container Corp.'s mills for re-use as paper stock in producing paperboard.

Arkell & Smiths' New Research Director

R. P. Kessler has been appointed director of research and development for the bag and package manufacturing firm of Arkell & Smiths, Canajoharie, N.Y.

He has been packaging engineer and director of packaging research for Arkell & Smiths for 11 years.

Triangle Container Names Sales Head

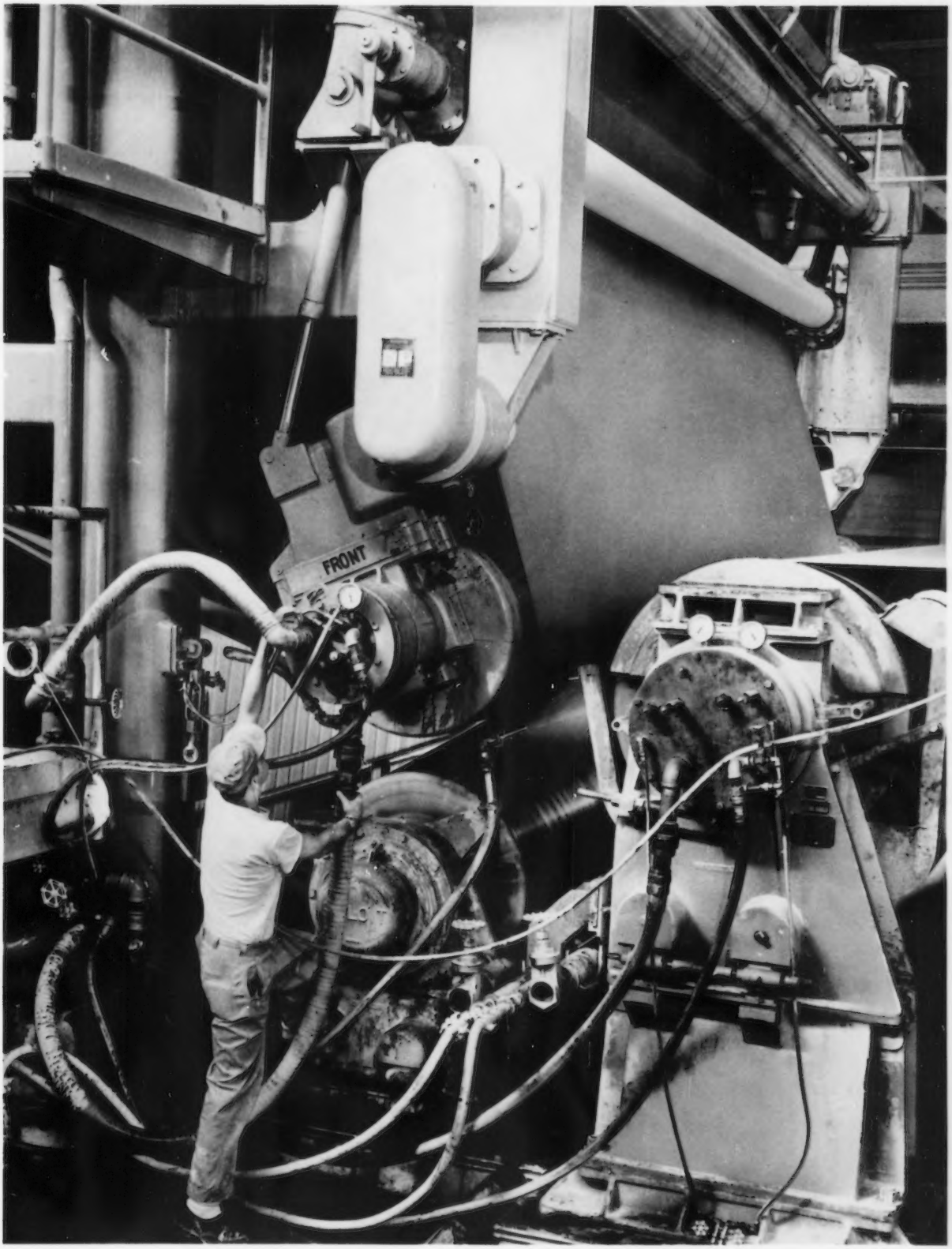
Orville C. Ottow has been appointed sales manager of the Corrugated division of Triangle Container Corp., Chicago, Ill.

Royal Container Signs Agreement with G.-P.

Royal Container Co., San, Francisco maker of corrugated cases and other containers, has reached a manufacturing agreement with Georgia-Pacific Paper Co.

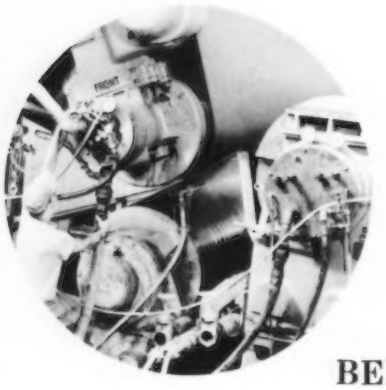
Under the plan reported by H. R. Freemon, president, Royal Container will convert, in its Millbrae, Calif., plant, kraft liner board from Georgia-Pacific's big pulp and paper mill now nearing completion at Toledo, Ore.

The agreement, Mr. Freemon said, will give Royal a wholly integrated operation, from timberland ownership to the manufacture of shipping containers. Georgia-Pacific Paper Co. is a wholly-owned subsidiary of Georgia-Pacific Corp.



BOWATERS SOUTHERN PAPER CORPORATION. PHOTO BY J. W. MILLER

Beloit Suction Pick-up A milestone in modern papermaking, the Beloit Suction Pick-up arrangement has eliminated the open couch draw, enabling the sheet to be transferred from the Fourdrinier wire to the press section positively, at high speeds. For further details, please turn the page.



BELOIT SUCTION PICK-UP

...a milestone in modern papermaking

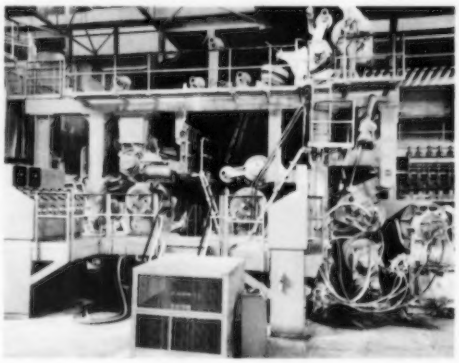
...materially increases efficiency, trim, test

Today's wide machines operating at speeds beyond 2000 feet per minute offer dramatic proof of the rapid evolution of papermaking machinery. One of the developments that has made this possible is the Beloit Suction Pick-up.*

Beloit installed one of its earliest full-size suction pick-up arrangements in 1932 on a 175″ machine. From this, Beloit engineers developed the modern suction pick-up in widespread use today.

This patented arrangement eliminates the open couch draw, provides a safe transfer of the sheet at high speeds, and cuts wet-end breaks to a minimum. Sheet handling at the wet-end is simplified. The sheet is picked off the wire by a suction roll and is carried automatically to the first open draw in the press section. The suction pick-up is one of many Beloit design features which provide faster, more efficient, trouble-free operation—the result of an extensive product development program to provide the papermaker with the most modern tools of production.

*United States and Foreign Patents and Patents Pending



your partner in papermaking **BELOIT**

PAPER MACHINERY

BELOIT IRON WORKS · PAPER MACHINERY · BELOIT WIS. U.S.A.

WHEN YOU BUY BELOIT...YOU BUY MORE THAN A MACHINE

How to Take Care of Rubber Rolls

Your maintenance program should include frequent inspection and care for rubber rolls. Reduced costs, increased service life are the results.

David A. Kuniholm

Rodney Hunt Machine Co.,
Orange, Mass.

Rubber rolls worth millions of dollars are scrapped every year because of neglect. To avoid this unnecessary situation, two cardinal principles should be observed by plant management.

The first is to purchase rolls which are properly engineered for the work they are to perform and which are manufactured by experienced roll makers. The second is to make sure that the rolls in your plant have a definite place on your maintenance program. Service records should show the date received, the date placed in operation, the date reground, etc.

Steps to Take While in Use

Soft rolls require more attention than hard rolls and should be inspected regularly for punctures, scratches and cuts. These, if neglected, will become deep and serious. A weekly inspection should be sufficient to detect tiny hairline fatigue cracks.

Overloading is a practice which should be avoided since it fatigues the roll prematurely. If more pressure is required, new and larger diameter rolls will pay off in longer life and better production.

Bearings should be lubricated carefully to avoid overheating and consequent splitting or mushrooming of the covering at the ends. However, they should not be overlubricated since excess oil may spill over on the rubber covering and cause damage to the surface. Also, rolls should be cleaned with alcohol or ethyl-free gasoline which evaporates quickly, because petroleum in any form, especially kerosene, is injurious to rubber. If rolls are frequently wet with oils, they should be washed once a week with water or strong soap and then rinsed well.

Pressure must be kept uniform at both ends of the roll to avoid uneven wear and cracking of the covering. Idle rolls should have all pressure on them released and should be removed from contact with the mating roll to avoid a flat spot at the standing nip. If, through negligence, a flat spot has developed, revolving the roll for two hours in hot water can sometimes remove it. If not, the roll must be reground.

Avoid all direct contact of rubber rolls with brass rolls. Brass provokes oxidation of the rubber which may cause the soiling of light colored materials. Substitute, instead, a hard rubber, stainless steel or chromium plated roll.

When a roll must be moved from place to place, the recommended method is to place a broad belt sling around the middle of the roll. If end slings are used, the ends of the roll should be protected with blocks or covers to prevent chains or ropes from fouling them.

Rolls in storage should be supported on the shaft, preferably in the original shipping case. Keep rolls wrapped in heavy kraft paper, as they are delivered. If possible, rotate rolls in storage 180 degrees once a week. Store them in a cool, dark, damp spot where the temperature is 50° to 60°F. Rolls should also be kept away from electrical appliances, especially motors that generate ozone, which is injurious to rubber.

When rolls are restored to service after storage, they should be reground to remove the film of oxidation from the surface. This is imperative if they have been stored for six months or more and is recommended in any case.

Regrinding

Regrinding restores a rubber roll to its original roundness, straightness, contour, and capacity for the work it was engineered to do. Regrinding is needed when the original surface has worn unevenly or has suffered minor or accidental damage or developed hairline cracks.

Regrinding is also required when the roll has been idle in storage or when the roll surface—especially that of an old roll—has developed a slight case-hardening or density change due to aging. These conditions apply especially to squeeze rolls of soft rubber; rarely to idler rolls of hard rubber.

Frequent regrindings on a well scheduled maintenance program add to the total service life of a rubber roll and produce a fresh new surface which restores original efficiency. To grind a little at frequent intervals is better

than grinding heavily at longer intervals.

Modern grinding equipment produces roll surfaces of remarkable precision, whether straight or crowned. This equipment, however, is not always found in the mills. The roll user who does not have a special roll grinder must generally rely on a machine lathe with a motor-driven grinding attachment. This equipment will produce reasonably satisfactory results in refinishing straight surface rolls. To be sure, perfect results depend on the interest of the operator; he must learn how to handle rubber just as he learns to handle metal. Crude repairs by an unskilled workman, however, should be avoided. They may ruin the roll or damage the goods in process, especially if the damage is too deep for regrinding and the roll requires re-covering. But there is no special difficulty; any man who can cut metal can grind rubber.

Grinding Conditions

The first consideration is the rigidity of the machine. It is impossible to do a first-class grinding job unless the grinding unit is rigidly mounted. A one- to two-horsepower motor should provide sufficient power. The grinding wheel should be 10 to 12 inches in diameter with a one-inch wide face and of reasonably coarse grain to prevent loading the wheel. The speed of the grinding wheel should be 2500 to 3000 r.p.m., following the recommendations of the wheel manufacturer. The grinding wheel and the roll should both rotate in the same direction so that the surfaces at the grinding point will be traveling in opposite directions. The roll should revolve at about 125 surface feet per minute for rolls of medium or hard density. Lower speeds may be required for softer rolls. Chatter marks indicate that the roll speed is too high.

Rubber rolls should always be ground dry, and if possible should be run on their own journals if the conventional lathe back-rests are available. If not, they may be run on shaft centers. In this case it is necessary to check the shafts by indicator to be sure that the bearing surfaces run true with the centers. Roll axis and grinding wheel axis should be in line.

Rough Cut

The first cut should be a roughing cut—not over 1/32-inch—to take off surface irregularities. Length of cut, travel speed of the toolpost, and speed of the roll may indicate a cut well under the maximum quoted. This depends somewhat on the roll diameter, combined surface-speed of roll and wheel, and hardness of the roll. In the final analysis, much depends on the skill of the operator and his feeling for the job. He must avoid burning the rubber and he must avoid loading the grinding wheel. The operator who is grinding a rubber roll for the first time should "creep before he walks," as he would with a metal he was cutting for the first time.

Finishing Cut

Finishing cuts should be made after the rough grinding passes have been completed, and the new surface should be formed below the depth of oxidation, hairline cracks, or surface damage. This depth should be .002 inch to .004 inch for best results; the last two or three passes of the wheel with no feed at all. If extra smoothness is desired, finish at high speed with 100- or 150-grit abrasive paper. Some operators prefer to finish with emery cloth mounted over a felt on a board.

Listed below are the specifications and manufacturers of several good all-purpose grinding wheels:

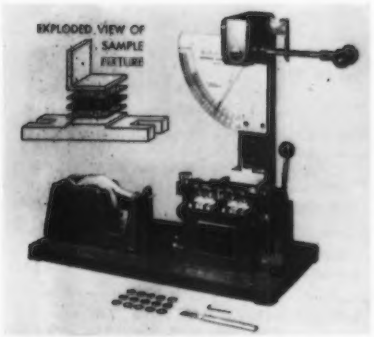
Specifications	Manufacturer
GC 363 L16-V62	Cincinnati Milling Machine Co.
RC 36 L6-B	Carborundum Co.
302-S14-XK152	Raybestos Manhattan Inc.
30-S15-KLM	Raybestos Manhattan Inc.
A 24-05VBE	Norton Co.
A 60-M5VBE	Norton Co.
C 724-K4-BL	Atlantic Abrasive Corp.

A tabulation of the most common troubles that arise with rubber rolls, and the recommended treatment is shown in the table.

Common Rubber Roll Troubles and Treatments

Fault	Causes	Treatment
Hairline cracks	Fatigue, sustained overload, stored too long, improperly stored, too dry, exposed to sunlight.	Regrind, reduce load, possibly replace with larger, heavier softer rolls.
Deep cracks	Frozen, exposed to ozone, hairline cracks were neglected.	Regrind below cracks if possible; otherwise roll must be re-covered.
Surface cracks near ends	Uneven pressure across roll, over-heating, swelling neglected.	Re-cover, correct localized pressure overload.
Swelling or mushrooming at ends	Hot bearings or rusted body surface at ends.	Correct lubrication; regrind or re-cover, cover end of metal body.
Ends of roll gouged or deformed	Damaged by sling chains in moving.	Protect ends when moving with chain sling; if possible use belt sling around middle.
Grooves or corrugations in roll	Sustained local overload, often from rope fabrics or narrow widths of material.	Use moving pin-rack, or change position of pin-rack weekly or daily.
Flat spot	Roll was left idle in contact with its mate; or was stored on its side.	Revolve in hot water for 1-2 hours. If not corrected, regrind. Don't leave idle rolls in contact. When storing rolls, support on journals.
Soil on light goods	Dirty roll, or oxidation from contact with brass roll.	Clean roll with alcohol or ethyl-free gasoline, but beware of fire hazard. If practicable, replace brass roll with other metal or with hard rubber roll.
Oxidation or case-hardening	Inactivity; long storage.	Regrind.

NEW EQUIPMENT AND SUPPLIES



Tests Internal Bond

Splitting very thin paper, or thicknesses up to heavy luggage board and measuring the energy required, is the feat performed by the newest Scott Tester, product of Scott Testers, Inc., Providence, R. I. Indicated applications of this "Model B Internal Bond Tester" are for testing gummed and laminated paper, and by those employing paper laminated with other materials. A joint development of Sisalkraft Corp. and Scott Testers, Inc., this equipment is claimed to provide makers and users of paper with an internal bond tester that combines both precision and ease of operation. The method of test is to laminate the paper on each side to a pulling clamp exactly one inch square. Lamination is by means of pressure sensitive double coated Scotch tape applied under pressure of 50, 100, 150 or 200 lbs. per square inch.

An integral supply of #400 Scotch tape or equivalent is provided by a pressure-sensitive tape dispenser built into the tester in alignment with the sample fixtures. This feeds tape into the fixture so that a single strip serves five samples. Each sample is laminated to a 1 x 1 inch steel bar at the bottom and at the top to a 1 x 1 inch 90° aluminum angle.

A unique method of multiple specimen preparation saves the technician's time and assures uniformity, five specimens being laminated to the clamps simultaneously by a single motion of the pressure control lever.

The internal strength of the paper is evaluated by measuring its resistance to a pendulum which swings against the vertical angle of the 90° top clamp and splits the specimen. There are two scales for the two capacities: 0-0.250 ft. lbs. and 0.180-0.500 ft. lbs. A pointer swings with the pendulum and remains in the extreme position reached on the scale, giving a fixed direct reading in 0.001 ft. lbs.

Literature and complete details available from Scott Testers, Inc., 51 Blackstone St., Providence, R. I.

"Two In One" Pipe

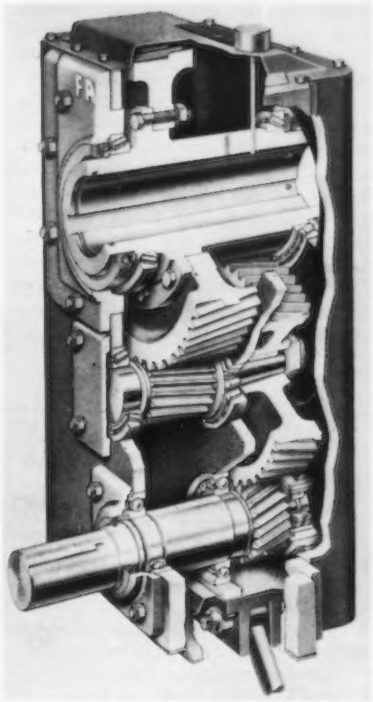
Development of a steel pipeline which is protected against external corrosion by a plastic coat of armour has been announced by the Pipe Division of Republic Steel. Called Republic X-Tru-Coat, it is reported to be the first steel pipe in the industry to be coated with an extruded plastic, and is designed for use as buried pipeline. Because of its polyethylene coating, it will withstand varying conditions of corrosive soils, water, fumes and electrochemical action. At the same time, its main core of steel provides the pipe with strength for pressures and factors of safety, according to the company.

Full scale production is underway in sizes from ¾" O.D. to 4½" O.D. in various wall thicknesses, and with coatings of polyethylene from .025" in thickness and up. Republic X-Tru-Coat is made from selected butt weld or electric weld pipe. A special elastic adhesive undercoating is hot applied to the pipe. Then a controlled thickness of polyethylene plastic is extruded over the undercoating. The coating is cut back from the end for welding or for the use of tools on threaded joints. The specially developed elastic undercoating never sets up or becomes hard and brittle. It remains "live" allowing the pipe to be flexed or bent without destroying the bond, according to the company's pipe engineers.

For more information write Republic Steel Corp., Pipe Division, Cleveland, Ohio.

Larger Capacity Shaft Mounted Drive

Falk Corp. has announced production of a new, larger capacity shaft mounted drive. The all steel 315J Falk shaft mounted drive is available in single reduction ratio of 5:1 and in two double reduction ratios of 14:1 or 25:1. Unit ratings range from 2 hp. at 5 r.p.m. to 50 hp. at 359 r.p.m.; maximum torque rating at low speed shaft is 31,000 lb. in. A longer center distance between shafts permits use of larger sheaves on installations where unit is mounted with input shaft toward driven machine or on through-shaft applications. Inspection covers on the three-wall one-piece all steel housing provide easy inspection of bearings and helical gears. An automotive type dip stick is provided for a quick check of oil level. For detailed information, including selection and dimension tables, ask for a copy of the new illustrated Bulletin 7100. Write: Falk Corp., Dept. 255, 3001 West Canal St., Milwaukee 1, Wis.



Announce New Line of Gear Motors

A new line of integral horsepower gear motors and related transmissions has been announced by General Electric Co.'s Gear Motor and Transmission Components Dept. at Paterson, N. J.

Designed in anticipation of industry's increasing need for compact and versatile speed reduction, the new line will be offered in three basic components: an integral-type unit, functionally equivalent to previous General Electric designs where gear and drive motor are packaged into a single unit; an all-motor type which features the drive motor coupled to the gear reducer and mounted on a common carrier; and a separate helical speed reducer which may be used with a variety of prime movers.

Mounting dimensions on all three

components are identical for similar rating and parts are interchangeable, permitting the user, maximum stock flexibility in back-up parts and units.

The design is compact, flexible in application, and offers ease of maintenance. Another new feature is a built-in provision for accomplishing ratio changes through a change of pinion and gear in the first stage only. Gear and bearing alignments are machined into the new line, permitting maintenance disassembly and reassembly without loss of alignment. The gear housing is completely accessible from either end, thus facilitating inspection or disassembly.

The line will be offered in three basic types of speed reductions: single reduction offset shaft in speed ranges from 780 to 350 r.p.m.; double reduction concentric shaft for speeds from 350 to 37 r.p.m. and triple reduction concentric shaft for output speeds from 30 to 13.5 r.p.m. Integral-type gear-motors will be available in the new line from one to 30 hp. Separate helical speed reducers and all-motor gear motors will be developed from one to 75 hp.

Figures of the Week

PAPER PRODUCTION RATIO REPORT—American Paper & Pulp Assn. Figures

(Production as percent of normal capacity)

COMPARATIVE WEEKLY SUMMARIES

	Sept. 7	Sept. 14	Sept. 21	Sept. 28	Oct. 5
1957	71.1	90.9	90.2	92.8r	91.7
	Sept. 8	Sept. 15	Sept. 22	Sept. 29	Oct. 6
1956	76.8	98.8	100.7	101.0	100.6

r Revised.

COMPARATIVE MONTHLY SUMMARIES

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1957	94.2	97.0	97.1	94.0	93.6	92.5‡	74.9‡	90.5‡	85.8				
1956	**99.6**	**102.6**	**102.9**	**102.5**	**101.8**	**99.9**	**85.6**	**96.7**	**94.3**	**99.5**	**97.6**	**90.9**	**97.9**

‡ Preliminary.

COMPARATIVE YEARLY SUMMARIES

	1950	1951	1952	1953	1954	1955	1956	1957
Year to Date	95.4	99.7	90.4	93.1	91.4	94.8	98.3	91.1
Year Average	95.8	98.0	88.6	92.3	91.6	94.9	97.9	

All of the above data is based on tonnage reported to American Paper and Pulp Association. Does not include mills reporting to National Paperboard Association, except in isolated cases where both paper and paperboard are produced and separate tonnage figures are not readily available. Does not include mills producing newsprint exclusively.

PAPERBOARD OPERATING RATIOS†

COMPARATIVE WEEKLY SUMMARIES

	Sept. 7	Sept. 14	Sept. 21	Sept. 28	Oct. 5
1957	72	98	96	99	97
	Sept. 8	Sept. 15	Sept. 22	Sept. 29	Oct. 6
1956	71	97	94	95	95

COMPARATIVE MONTHLY SUMMARIES

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1957	91	94	94	92	93	91	72	94	91				
1956	**100**	**100**	**99**	**100**	**99**	**98**	**77**	**95**	**89**	**96**	**93**	**84**	**94**

† *Percents of operation based on "Inch-Hours" reported on a 6-day basis to the National Paperboard Association.*

SUMMARY OF PAPERBOARD STATISTICS—National Paperboard Assn. Figures

ITEM	THIS WEEK ENDING Oct. 5, 1957	LAST WEEK ENDING Sept. 28, 1957	CUMULATIVE TO DATE Jan. 1 to Oct. 5, 1957
% Activity	97%	99%	91%
	Tons	*Tons*	*Tons*
Total Production	298,603	300,659	10,766,838
Liner	104,230	106,651	3,696,419
Corrugating Material	49,073	45,040	1,642,564
Chip & Filler Board	3,997	5,592	208,855
Total Containerboard	157,300	157,283	5,547,838
Folding	54,446	56,965	1,988,937
Set-Up	12,092	12,999	439,771
Special Food Board	23,651	24,493	950,711
Other	51,114	48,919	1,839,581
Total Boxboard	141,303	143,376	5,219,000
Total Orders	*Tons*	*Tons*	
Received	403,701	295,363	
Unfilled End of Week	547,046	444,626	

PRICES OF MATERIALS

Aluminum sulphate:
comL bulk, c.l. wks. ....cwt. $1.85 / 2.05
iron-free, c.l. wks. .....cwt. 3.55 / —

Casein, acid prec.:
dom. sh. pt. c.l. (30 mesh) cwt. 56.00 / —
Arg. ex. dock .....cwt. 21.50 /23.00
New Zealand .....cwt. 22.50 /25.00

Caustic soda:
c.l. wks. solid, 76% .....cwt. 4.30 / —
flak. & grd. drums, c.l....cwt. 4.70 / —
liquid 50% tanks.... 2.90 / 3.00
liquid 73% tanks.... 3.80 / 3.10

China Clay
dom., dry-grd., airfloat:
325 mesh bgs., c.l. Geo. ton 10.00 / —
300 mesh, bgs., c.l. Geo. ton 13.50 /14.50
imp., white, lump, c.l. ex. dock 20.00 /35.00

Chlorine:
single-unit tanks, works...cwt. 3.15 / —
multiple unit, 2-5 cars per yr. 5.25 / 4.05

Lime:
hydrated, bulk, c.l. N.Y. ..ton 23.63 / —
quicklime, bulk, c.l. N.Y. ton 22.13 / —

Gum rosin:
K, M, N, drums, c.l. Savan, cwt. 7.45 / 7.55

Rosin size:
70%, gum & pale paste, tank
cars, south, sh. pt. .....cwt. 7.38 / 7.48

Saltcake:
dom. bulk, 100% anh. wks. ton 28.00 / —

Soda ash:
light, 58% ash bags, wks..cwt. 1.90 / —
bulk, c.l. wks .....cwt. 1.60 / —

Sodium chlorate:
drums, c.l., wks. .....cwt. 9.00 / —
drums, l.c.l., wks .....cwt. 9.50 /10.50

Sodium peroxide:
dms., c.l. E. of Miss. .....lb. .20½/ —
l.c.l. (same basis) ..... .21 / .21½

Sodium silicate, 40° Be.:
tank-cars, wks. .....cwt. 1.20 / —
drums, c.l. wks. .....cwt. 1.55 / —
47° Be. WW.
tank-cars, c.l. wks. .....cwt. 1.90 / —
drums, c.l. wks. .....cwt. 2.25 / —

Soybean, protein:
chem. isol., wks. c.l. bags...lb. .23 / —

Starches:
corn, multiwalls, c.l. prod. plant:
pearl .....cwt. 6.49 / 6.75
white, dextrins .....cwt. 8.08 / 8.30
chlorinated .....cwt. 8.25 / 8.35
potato, Idaho, c.l. wks.....cwt. 6.50 / —
East, fr. all. 50 cents cwt.
potato, Maine, f.o.b. wks. cwt. 6.25 / —

Sulphuric acid:
60° Be. cbys. c.l. wks.....cwt. 2.00 / —
l.c.l. wks. .....cwt. 2.45 / —
tank-cars, wks. .....ton 18.60 / —

Sulphur:
crude, c.l. mines, contract,
long ton 23.50 / —
f.o.b. vessels Gulf dock...ton 25.00 / —

Sulphur dioxide:
liquid, coml. cyl., wks. ....lb. .10 / .12
multi-unit cars, wks. .....lb. .0535/ —

Talc, fibrous grd., bags:
c.l. wks., N.Y. .....ton 28.00 / —
l.c.l. wks., N.Y. .....ton 31.00 /36.00

Titanium dioxide:
anatase, c.l. dlvd. E. bags..lb. .25½/ —
l.c.l. dlvd. .....lb. .26½/ —
rutile, c.l. dlvd. .....lb. .27½/ —
l.c.l. dlvd. .....lb. .28½/ —

PAPER PEOPLE

William T. Bess, Jr.

Named Asst.-to-Pres. of Union Bag-Camp

Union Bag-Camp Paper Corp. has appointed William T. Bess, Jr. assistant to the president. A member of the Union organization since 1950, Mr. Bess served most recently as assistant director of multiwall bag sales.

Adm. Radford Accepts Champion Position

Admiral Arthur W. Radford, who recently retired from his position as chairman of the Joint Chiefs of Staff, has joined Champion Paper and Fibre Co., Hamilton, Ohio, as a consultant. Champion's president, Reuben B. Robertson, Jr., announced that Admiral Radford's primary functions would be to advise him and the company's board of directors on international trade and associated subjects.

Heads Scott's Southern Div.

John W. McNichol has been appointed general manager of the southern division of the Scott Paper Co., with headquarters at the company's Mobile plant, formerly the Hollingsworth & Whitney plant.

Mr. McNichol came to Mobile in March, 1956, as executive assistant to Dennis E. Cousins, Scott vice president in charge of southern operations, who retired last week. In his new position, Mr. McNichol will take over the executive functions formerly administered by Mr. Cousins.

Mr. McNichol joined Scott in 1939 as a supervisor in the finishing department at the Chester plant and after holding various supervisory positions in that department he was made superintendent of finishing in 1943. He was subsequently promoted to paper mill superintendent, production manager and assistant plant manager. In 1950, he was made plant manager at Chester and continued in that position until 1956 when he was transferred to Mobile.

Henry C. Schramm

Westvaco Chief Engineer Retires

Henry C. Schramm, chief engineer of the West Virginia Pulp and Paper Co. mill at Williamsburg, Pa., and an employee for more than 40 years, who a quarter of a century ago helped to pioneer the field of preventative maintenance, was honored recently by top division officials and life-time friends at a reception and dinner held at the Spruce Creek Rod & Gun Club, celebrating his retirement as an active employee of the company.

The occasion marked the close of Schramm's career in the Westvaco organization, where company policy calls for compulsary retirement at age 65. It also marked the beginning of a new career for Mr. Schramm as an instructor in engineering at the Altoona Undergraduate Center of the Pennsylvania State University.

Robert J. Blum

Arthur L. Harris

H. Warren Kampf

Mead Corp. Elects Three New Vice Presidents

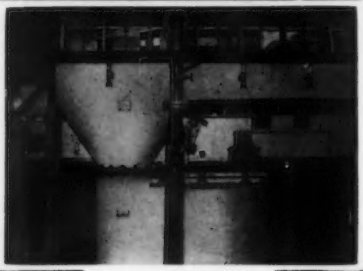
The Board of Directors of Mead Corp. has elected Robert J. Blum, Arthur L. Harris, and H. Warren Kampf, vice presidents of the corporation.

Mr. Blum is president of Mead Board Sales, Inc., and Excello Paper Products Co. In his new position he will coordinate sales of all Mead paperboard and converted paperboard products. His headquarters will continue to be in Cincinnati.

Mr. Harris is president of Mead-Atlanta Paper Co., Atlanta, Ga. He is also a Mead director. His headquarters will continue to be in Atlanta.

Mr. Kampf is president of Mead Papers, Inc., sales organization for all Mead white papers and white paper products. His headquarters will continue to be in Dayton, Ohio.

POIRIER
Extraction Systems



Reduce Costs
●
Increase Production
●
More Uniform Sheet
●

Here's how:—

- Automatically provides correct vacuum at all suction boxes.
- Eliminates large suction pumps and costly maintenance.
- Provides longer wire life.
- Makes possible working of more water into the sheet.
- Scrutinizes every inch of sheet.
- Assures proper amount of air coming through sheet at dry boxes.
- Operates automatically regardless of stock weight or grade.
- Assures correct moisture content in sheet at the dandy.

These are just a few of the reasons why a Poirier Baromatic Syphon System is so popular. It will help you too.

Write for full information today.

POIRIER CONTROL COMPANY
Waterville 1, Maine

Specialists in Stock Control Equipment

E. L. Neal

Elected to Board Of Gaspesia Sulphite

E. L. Neal, who has been elected to the Board of Directors of Gaspesia Sulphite Co. Ltd., Chandler, P.Q. Mr. Neal, who is general manager of the company, has also been appointed a vice president.

Leroy Lee

Mead Division Eng. in Lynchburg

Leroy Lee, chief draftsman at Mead Corp.'s Chillicothe, Ohio Division since 1952 has been named division engineer of Mead's Heald Division, Lynchburg, Va.

Mr. Lee was elevated to the position following the sudden death of William P. Guenther, 57, who suffered a heart attack while vacationing with his family in Massachusetts. Mr. Guenther had served as Lynchburg's division engineer since 1940.

Mr. Lee joined Mead as an engineering trainee in Chillicothe following his graduation in 1947 from the University of Minnesota.

He served as a junior and senior engineer for five years until he was named chief draftsman in 1952.

Riegel's Carolina Div. Promotes Peters

Riegel Paper Corp. has appointed C. Cline Peters as assistant to the manager of pulp Production at Riegel's Carolina Division, Acme, N. C. Prior to his promotion, Mr. Peters held the position of assistant plant engineer at the Riegel Carolina plant.

Sauve Advanced

Theodore J. Sauve who has been promoted by Marinette Paper Co., Marinette, Wis., to quality supervisor in its consumers' representative department. He succeeds John T. McKernan, who is being transferred to the Detroit plant of Scott Paper Co.

NEWS OF ASSOCIATIONS

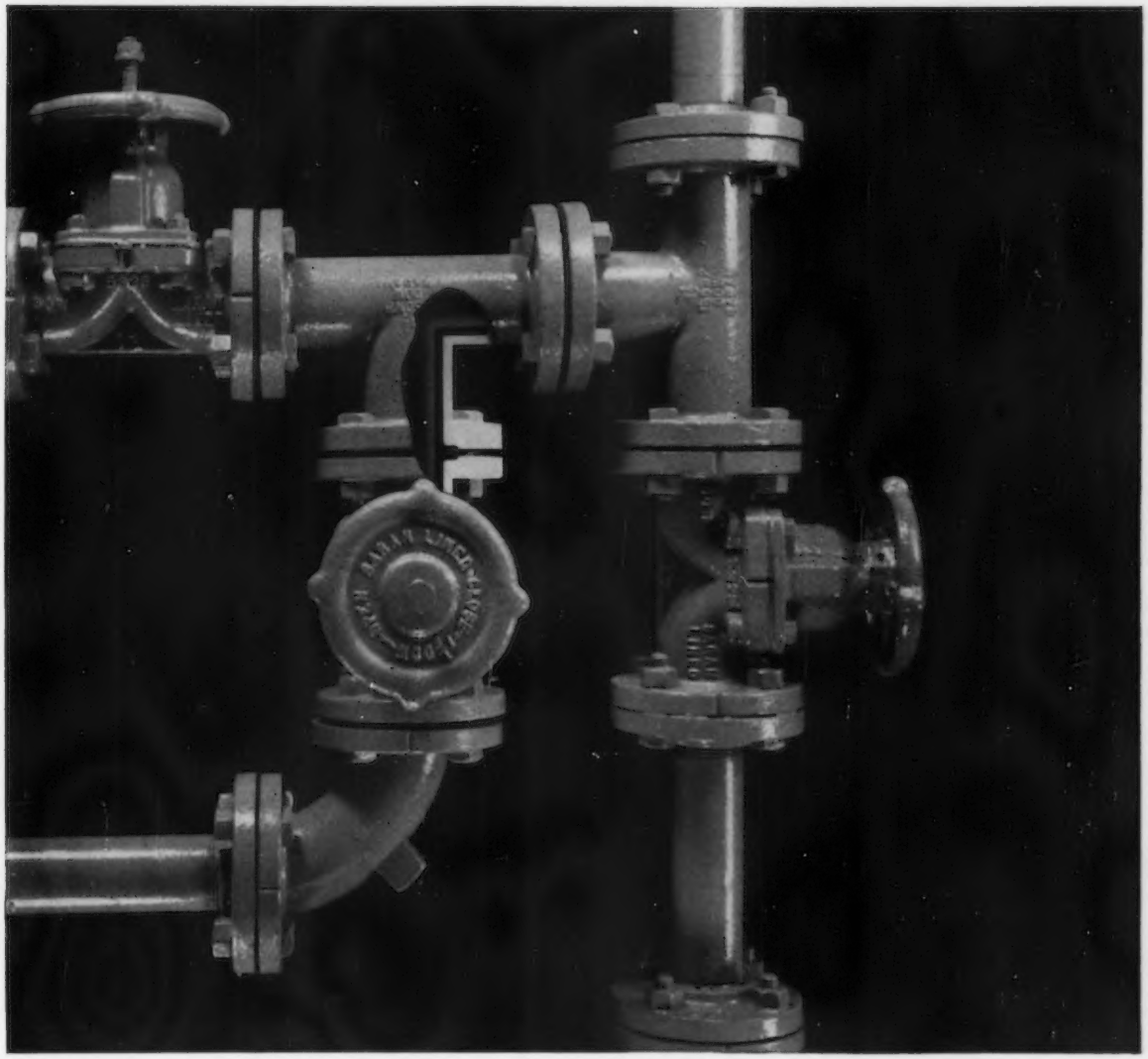
Metro TAPPI October Meeting

Empire State TAPPI's Metropolitan District held its second meeting of 1957 on October 8 at Fraunces Tavern, Pearl and Broad Sts., New York City.

Speaker for the evening was T. S. Morse, manager of sales service for the Paper Chemicals Division of Hercules Powder Co. Subject of his talk was "Rosin and Rosin Size as Used in Papermaking." Mr. Morse presented a comprehensive treatment of his subject, briefly touching on sources of rosin, rosin supply and rosin chemistry, and concentrating on the uses and efficiency of different rosin sizes and the properties imparted to paper and board by these products.

New President

Robert H. Garretson has been appointed president and member of the board of directors of Stationers Corp., Los Angeles. He succeeds Charles E. Conley, who resigned. Mr. Garretson formerly was in management and sales of International Business Machines Corp. since 1938. Stationers Corp. is one of the largest retail and wholesale stationery, school supply and printing organizations in the West.



Whatever the piping arrangement, liquid never touches metal in saran lined pipe, fittings or valves.

You can see why saran lined pipe cuts costly downtime

It's a rigid steel pipe lined with durable saran that corrosive liquids won't bother

Now you can pipe commonly used acids, alkalies and other corrosive liquids without worrying about corrosion. With saran lined pipe, the liquid never touches metal – in the pipe, valves or fittings. Corrosion can't get a start–downtime troubles are eliminated.

Because it is two pipes in one, steel swaged onto saran, it has high strength. In fact, saran lined pipe will withstand working pressures up to 300 psi. Saran lined valves and fittings are available for 150-psi and 300-psi working pressures.

You'll get other advantages when you use saran lined pipe. It's easy to fabricate and easy to install. Conventional pipe fitters' tools can be used for cutting and threading. And you can hang it as you would ordinary steel pipe.

If your operation can profit from long-lasting, corrosion-free piping, investigate saran lined pipe today. THE DOW CHEMICAL COMPANY, Midland, Michigan.

SARAN LINED PIPE COMPANY
DEPT. SP1594E
2415 BURDETTE AVENUE
FERNDALE 20, MICHIGAN

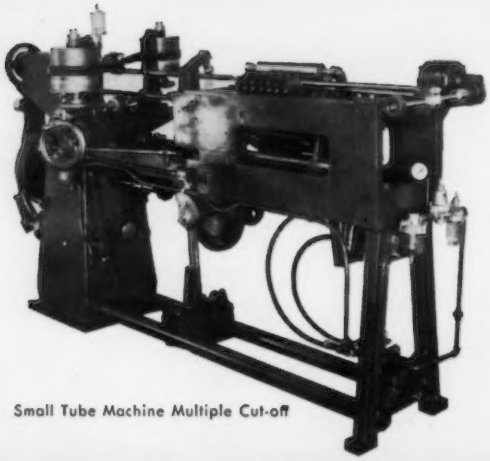
Please send me information on saran lined pipe, fittings and valves.

Name_____ Title_____ Company_____

Address_____ City_____ State_____

YOU CAN DEPEND ON DOW

Core Recutter



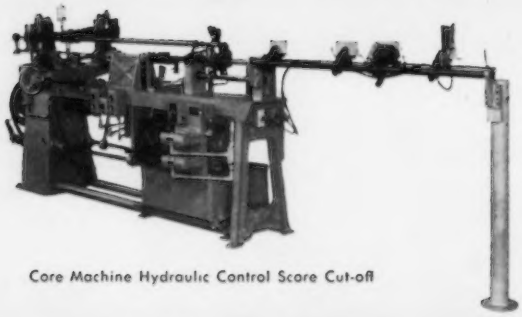
Small Tube Machine Multiple Cut-off

THESE CORE MACHINES ARE DELIVERING

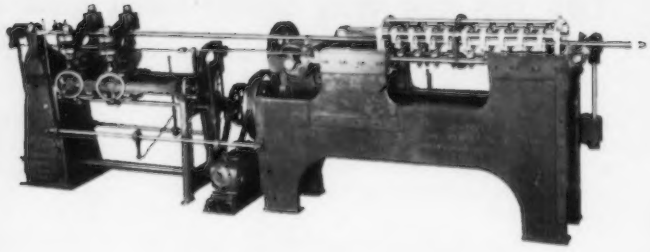
THE PERFORMANCE WE PROMISED.

ASK THE COMPANIES THAT OWN THEM.

Core Printer



Core Machine Hydraulic Control Score Cut-off



Multiple Cut Core Machine

printing presses, rewinders, embossers, folders,
napkin and core machines and special converting machines

PAPER CONVERTING MACHINE COMPANY

GREEN BAY, WISCONSIN

P C
M C

Sandoz colors . . . for bright, attractive papers

Brightest of the Basic browns, Sandoz Bismarck Brown G opens up a new, brighter range of Basic tans and browns . . . permits the use of a less expensive furnish where standard shades are desired . . . offers considerable savings over regular types of Basic browns in producing shades of brown and black.

Extra values like these are built into every Sandoz quality dyestuff and chemical for papermakers.

Call on our paper laboratory for expert application counsel on your next paper coloring problem. SANDOZ, INC., 61-63 Van Dam Street, New York 13, N. Y. ALgonquin 5-1700.

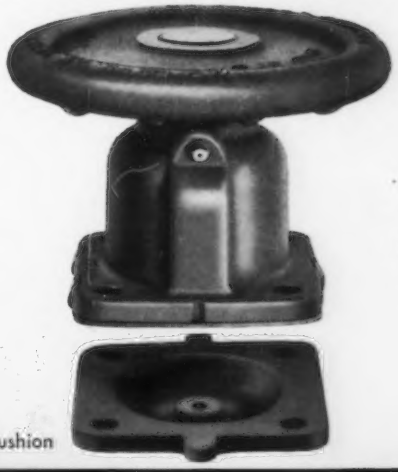
SANDOZ

THINKS AHEAD WITH PAPER

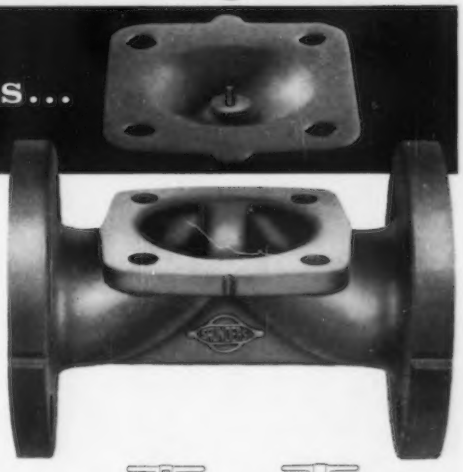
SANDOZ

Outperforms other valves under SEVERE chemical conditions

GRINNELL-SAUNDERS DIAPHRAGM VALVES



with TEFLON Diaphragms...

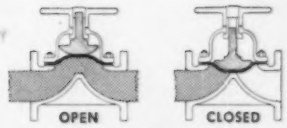


Grinnell Teflon Diaphragms are made by a special process which produces a better product of greater density, toughness and flex life.

The four case histories cited below demonstrate that Teflon offers a very high degree of chemical inertness to some of the most difficult chemicals which industry today must handle. Yet these are only a few of many success stories in the Grinnell files.

Diaphragm life depends on temperature, pressure and frequency of operation. Inquiries must include complete service data to receive prompt and careful attention.

Service Conditions	Saunders Valve Now Used	Service Life: Teflon Diaphragm	Service Life: Previous Valve
Case 1. Benzene hexachloride (30%-40% benzene, free chlorine); 120 to 130 F, 10 to 20 psi; operated 3 to 4 times daily	Glass lined bodies; Teflon Diaphragm; 1 to 3 inches	10 to 14 mos.	1 to 2 mos.
Case 2. 90%-95% HNO_3 plus 1.8% HF (specific gravity 1.62–1.77) 115 F in summer; 40 F in winter; 125 psi; operated 2 to 3 times daily	Durimet 20 body; Teflon Diaphragm; 1 to 3 inches	8 months	2 months
Case 3. $AlCl_3$ complex; ambient to 220 F; 0-50 psi; operated 1 to 2 times daily	Glass lined bodies; Teflon Diaphragms; 1 to 4 inches	9 months	6 months
Case 4. Sulphuric acid 85%; outside temperature; no pressure; operated 4 times daily	Iron bodies; Teflon Diaphragms; 2½ inches	Still in service after 1 year	3 weeks



Features of Grinnell-Saunders Diaphragm Valves

- Diaphragm lifts high for streamline flow in either direction.
- Body, linings and diaphragm materials to suit service conditions.
- Resilient diaphragm assures positive, leak-tight closure even with grit or scale in the line.
- Diaphragm absolutely isolates working parts from fluid . . . sticking, clogging, contamination, corrosion eliminated.
- Simple maintenance. Diaphragm can be replaced easily without removing valve from the line. No packing glands to demand attention. No metal-to-metal seats to become damaged or wire-drawn.

GRINNELL

WHENEVER PIPING IS INVOLVED

Grinnell Company, Inc., Providence, Rhode Island • Coast-to-Coast Network of Branch Warehouses and Distributors

pipe and tube fittings • welding fittings • engineered pipe hangers and supports • Thermolier unit heaters • valves
Grinnell-Saunders diaphragm valves • pipe • prefabricated piping • plumbing and heating specialties • water works supplies
industrial supplies • Grinnell automatic sprinkler fire protection systems • Amco air conditioning systems

...increasing productivity without adding personnel!

Management men in every industry are giving productivity and profits—*as well as personnel*—a lift by integrating Towmotor mass-handling in all operations from receiving to delivery.

Every department benefits. More work gets done. And you don't need more men to do it because Towmotor fork lift truck operators are finding it's *fun* to multiply the handling of materials aided by 12 new Towmotor improvements like these:

- New functional body styling
- New pace-setting comfort features
- New "tight-spot" maneuverability
- New centralized easy-reach controls
- New positive-response hydraulic lift
- Towmotor-improved power steering

Some of the industry's most significant advances in fork lift truck design and performance are shown in Towmotor's latest bulletin #SP-23. See how they help supplement your personnel—permit your men to do a bigger day's work easier—give each operator the power to improve your plant's productivity and profits.

Write Towmotor Corporation, Cleveland 10, Ohio. We'll send the illustrated booklet immediately.

Leaders for 38 years in building Fork Lift Trucks and Tractors

TOWMOTOR ® THE ONE-MAN-GANG — GERLINGER

Gerlinger Carrier Company, Dallas, Oregon is a subsidiary of Towmotor Corporation, Cleveland, Ohio

If it's made with TITANOX*
it's worth looking into

Paperboard products really show their colors when TITANOX titanium dioxide white pigments perk up the package. For heightened point-of-sales response, for greater product identification . . . there's nothing like the whitening, brightening and opacifying power of these TiO_2 products.

There's a line of TITANOX pigments for paper-making processes. Count on them to simplify your problems in white pigmentation, or consult our Technical Service Department for assistance. Titanium Pigment Corporation, 111 Broadway, New York 6, N. Y. Offices in principal cities.

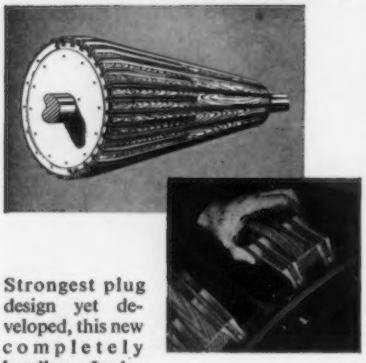
TITANIUM PIGMENT CORPORATION

Subsidiary of NATIONAL LEAD COMPANY

*TITANOX is a registered trade mark for the full line of titanium pigments offered by Titanium Pigment Corporation. 5212

TIME FOR REPLACEMENT?

ED Jones® Adapta-Plug



Strongest plug design yet developed, this new completely bandless Jordan plug is easiest to strip and fill. New, improved design holds bars firmly in place, eliminates hazards of slot wear and corrosion. Available in solid plug — or sleeve form for easy conversion of old worn plugs. Write for Bulletin EDJ-1094.

ED Jones®

FULBAR

SHELL FILLINGS

A complete one-piece assembly, made to fit the shell body of any Jordan. No keys or wedges. Fulbar rigidity and one-piece construction compensate for inequalities in old Jordan shells — save hours of installation time. Many other new advantages make this the ideal shell filling. Write for Bulletin EDJ-1094 and names of satisfied users.

E. D. JONES & SONS COMPANY

Pittsfield, Massachusetts

Builders of Quality Stock Preparation Machinery

In Canada: The Alexander Fleck, Ltd., Ottawa

PRICES OF FIBERS

MARKET WOOD PULP

FOURTH QUARTER CONTRACT PRICES PER SHORT AIR-DRY TON

	Delivered Basis U.S.	Canadian	Swedish	Finnish	Norwegian
Groundwood	$82.50/ 90.00	$82.50/ 90.00	§$90.00/ —	§$90.00/ —	§$90.00/ —
Bleached Gw'd.	$97.50/100.00	$97.50/100.00			
Kraft, Blchd.	157.00/ —	160.00/ —	$157.00/162.50*		$157.50/ —
Kraft, Blchd. Hdwd.	150.00/ —		$137.00/ —		
Kraft, Semi-bleached	140.00/ —	140.00/ —			
Kraft, Unbl.	117.50/125.00	125.00/130.00	†125.00/130.00	125.00/ —	
Sulphite, Blchd.	155.00/ —	155.00/ —	*155.00/ —	*155.00/ —	155.00 —
Sulphite Bl. Hdwd.	150.00/ —				
Sulphite, Unblchd.	135.00/ —	135.00/ —	†135.00/ —	*130.00/ —	
Sulphite, Unb'l. Gl'sn		134.00/ —	†134.00/ —		
Soda, Blchd.	147.00/150.00	150.00/ —			

§ On Dock Atlantic Ports. * Freight allowed. † Varying Freight Allowances

NEW YORK RAG MARKET

New Domestic Cotton Cuttings
Delivered Mill Basis
PRICES NOMINAL

	Per 100 lbs.
No. 1 White Shirts	$13.50/$14.00
No. 1 Unblchd. Muslins	16.00/ 16.75
Blchd. & Unblchd. Underwears	15.00/ 15.50
No. 1 Light Silesias	7.00/ 7.50
No. 1 Light Blue Overalls	7.25/ 8.00
Percales	6.00/ 6.50
No. 1 Light Prints	5.00/ 5.50
Suntan Khakis	5.50/ 6.25
Cottonades	3.25/ 3.75
No. 1 Washables	2.50/ 2.75

Old Domestic Cotton Rags
(Prices to Dealers, f.o.b. Ship. Pt.)

	Per 100 lbs.
Mixed White	$3.00/$3.25
Cotton Pants & Overalls	2.00/ 2.25
Twos and Blues, Repacked	1.50/ 1.75
No. 2 Roofing	.60/ .70

COTTON LINTERS

Memphis Market
f.o.b. Oilmills

Week Ended October 14 Grade	For 100 lbs.
1 n.a.	
2	$9.50/ $9.25
3 1 cut—felting	8.75/ 7.75
4	8.00/ 7.00
5	7.00/ 6.50
6	6.00/ 5.50
7	5.50/ 5.00

*Based on 73% cellulose.

Old Rope & Bagging
(Prices to Dealers, f.o.b. N.Y.)

	Per 100 lbs.
New Burlap Cuts	$5.75/$6.50
Scrap Burlap	4.50/ 5.25
Australian Wool Pouches	5.25/ 5.75
Gunny	5.50/ 6.25
No. 1 Domestic Manila Rope	7.75/ 8.25
No. 1 Foreign Manila Rope	6.25/ 6.50
Domestic Sisal Strings	4.25/ 4.50

WASTE PAPER MARKET

Mill Prices, f.o.b. Trucks Shipping Point — Includes Brokerage

These quotations are a partial indication of the price range on volume tonnage in each market on the date specified, as gathered from major dealers. SPECIAL PACKINGS AND SPOT TONNAGE NOT INCLUDED. Prices nominal.

	New York October 14	Boston October 14	Chicago October 14	Los Angeles October 14
No. 1 Mixed Paper	$4.00/ 6.00	5.00/ 7.00	4.00/ —	12.00/ —
No. 1 News	13.00/ 15.00	14.00/ —	14.00/ —	11.00/ —
Overissue News (Lg. size)	16.00/ 18.00	12.00/ 14.00	19.00/ —	13.00/ —
Mill Wrappers	11.00/ 13.00	9.00/ 14.00	7.00/ —	13.00/ —
Old Corrugated Containers	24.00/ 25.00	21.00/ 25.00	27.00/ —	18.00/ —
Super Resorted Kraft Paper	30.00/ 35.00	35.00/ 42.00	35.00/ —	45.00/ —
New Double Kr. Ld. Corr. Cuts	25.00/ 30.00	35.00/ 40.00	40.00/ —	30.00/ —
(Semi-chem. medium)	45.00/ 50.00	45.00/ 50.00	45.00/ 50.00	35.00/ 45.00
New 100% Kraft Corr. Cuts	50.00/ 55.00	50.00/ 55.00	55.00/ —	40.00/ —
New Br. Kraft, Env. Cuts	65.00/ 70.00	70.00/ 75.00	55.00/ —	45.00/ 50.00
New Br. Kr. Bag Waste Prntd.	55.00/ 60.00	55.00/ 60.00	50.00/ —	45.00/ 50.00
New Br. Kr. Bag Waste Unprintd	60.00/ 65.00	65.00/ 75.00	65.00/ —	45.00/ 50.00
No. 1 Groundwood Shvs.	25.00/ 30.00	20.00/ 30.00	16.00/ —	25.00/ 30.00
White Newsblanks	50.00/ 55.00	45.00/ 55.00	40.00/ —	55.00/ —
No. 1 Soft White Shvs.	55.00/ 60.00	60.00/ 65.00	60.00/ —	— / —
Super Soft White Shvs.	65.00/ 70.00	75.00/ 85.00	70.00/ —	— / —
Hd. White Shvs.	90.00/ 95.00	100.00/110.00	90.00/ —	85.00/ 90.00
Hd. White Env. Cuts	115.00/125.00	120.00/125.00	100.00/ —	100.00/110.00
Col. Tab. Cards	50.00/ 60.00	60.00/ 65.00	47.50/ —	32.50/ —
Manila Tab. Cards	60.00/ 70.00	70.00/ 75.00	65.00/ —	65.00/ —
No. 1 Col. Ledger	30.00/ 32.00	30.00/ 35.00	40.00/ —	22.50/ —
White Ledger	45.00/ 50.00	50.00/ 55.00	52.50/ —	35.00/ —
Mixed Book & Mag.†	18.00/ 20.00	19.00/ 20.00	12.00/ —	— / —
No. 1 Books‡	25.00/ 27.00	22.00/ 24.00	27.50/ —	— / —

† Includes Time & Life; no coarse groundwood. ‡ Not to exceed 10% of groundwood.

Technician at meter measuring *brightness* of paper made with Du Pont "Ti-Pure" titanium dioxide white pigment.

Yours for the asking...one of industry's most complete paper labs to help solve your pigmenting problems

One of the many tests run on paper at Du Pont's paper laboratory. Here softness, smoothness and porosity are tested on a Gurley-Hill S-P-S Tester.

Every year many tough pigmenting problems are successfully solved at Du Pont's paper laboratory at Newport, Delaware. One of the most completely equipped anywhere . . . its facilities are placed at your disposal as part of the service of the Du Pont Pigments Department.

The Du Pont paper laboratory can duplicate practically every operation required in the making of paper. Testing is conducted by a team of expert researchers upon whom you can depend to give you an accurate answer. The laboratory's research program also includes constant experimentation to find new methods to make the use of white pigments in paper more economical.

The paper laboratory plays an important part in training field personnel. Every Du Pont Pigments field and sales representative receives a complete grounding in the techniques and methods of using white pigments in papermaking. You can be confident that when your Du Pont representative sends his report back to the laboratory—your problem will be clearly stated.

And backing this integrated service program every step of the way is the 20 years' experience Du Pont has built up serving the paper industry with "Ti-Pure" titanium dioxide white pigments. For complete information, or for technical assistance, call on your Pigments Representative or write: E. I. du Pont de Nemours & Co. (Inc.), Pigments Department, Wilmington 98, Delaware.

PIGMENTS DEPARTMENT

DU PONT

REG. U. S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING
...THROUGH CHEMISTRY

Taylor

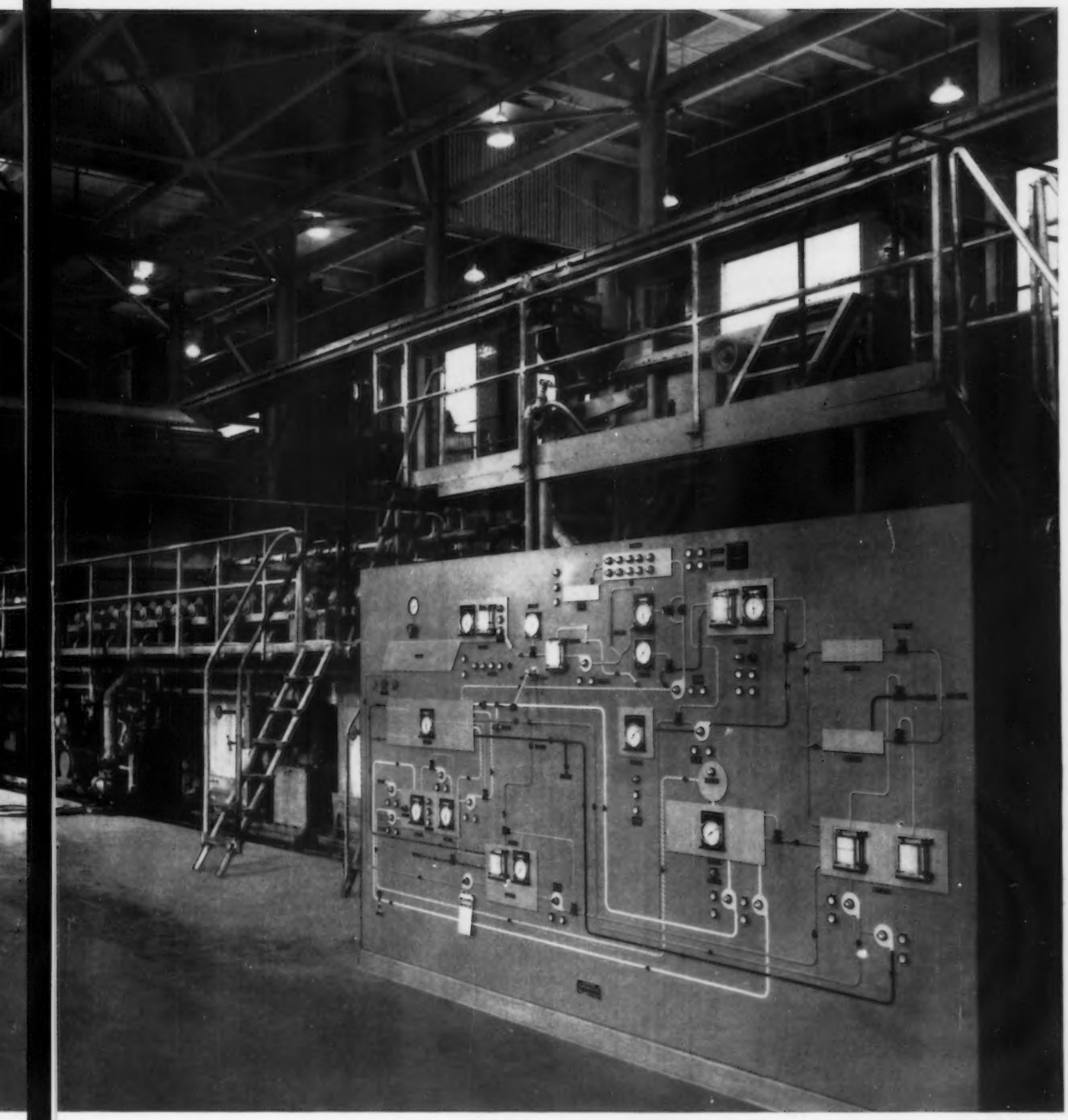
GRAPHIC PANEL CONTROLS CONSOLIDATED'S NEW, HIGH SPEED PAPER MACHINE

Taylor Instruments
MEAN
ACCURACY FIRST

VISION · INGENUITY · DEPENDABILITY

THE new high-speed enamel paper machine at the Biron Division of Consolidated Water Power & Paper Company is capable of producing a sheet of paper 185 inches wide at speeds up to 2000 feet per minute. An automatic graphic panel, made by Taylor Instrument Companies, contributes in a large part to the successful operation of this machine.

The operator's wet end panel, shown above, controls the various water and stock systems



for the No. 5 machine. The variables are measured, recorded or indicated, and then remotely controlled by the instruments on the graphic panel. Some of the variables are water temperature, water level, stock level, consistency and pH. This panel also controls the stopping and starting of pumps, agitators and other electrically operated devices associated with these systems. Other Taylor instrumentation is employed in the stock preparation system.

The Taylor Instrument Companies is fully equipped to handle instrumentation for complete mills as well as individual projects . . . either in pulping or paper making.

* * *

For more information about how Taylor can help you in your operation, see your Taylor Field Engineer, or write the Taylor Instrument Companies, Rochester, N. Y., or Toronto, Canada.

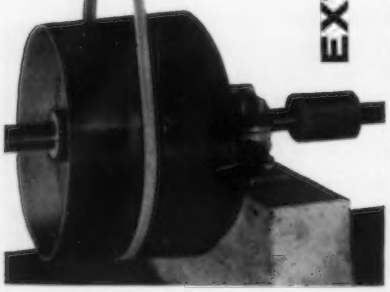
during the
last 18 months
EXTREMULTUS
BELTING
has been
installed in
130
of the nation's
leading
paper mills

THESE ARE A FEW OF THE REASONS:

- Freedom from stretch eliminates take-up
- Widths a small fraction of the belts replaced
- Speeds up to 10,000 feet per minute
- Unexcelled shock and vibration absorption
- Ratios as high as 20:1 at contact arcs of 90°

for full details, write
EXTREMULTUS, Inc.
405 Lexington Ave., N.Y.C.

EXTREMULTUS



NEWS OF SUPPLIERS

Harris-Seybold Co., Cottrell Co., and Macey Co. has relocated the New York office on the first floor of the new 800 Second Avenue Building. Located on corner of 42nd St. and Second Ave., the new accommodations provide office space for the combined companies, a permanent product display area, and enlarged warehousing facilities for supplies and replacement parts.

The new address is headquarters for T. M. Broadston, Eastern sales manager for Harris-Seybold; A. A. Hobart, Eastern sales manager for Cottrell; and Lewis P. Sheldon, Eastern sales manager for Macey; and all New York sales and service representatives of these companies. A sizeable portion of the 8000 square feet is warehousing space for Harris-Seybold and Macey parts and supplies, with a truck-loading dock accessible from 43rd Street. Harris offset presses, Seybold paper cutters, and Macey collators and gathering machines will be displayed in the area facing on Second Avenue and 42nd Street. The new telephone number is YUkon 6-7600.

Testing Machines, Inc., New York City, manufacturers and distributors of a wide variety of pulp, paper and container testing equipment, has acquired the pulp knife manufacturing organization of A. B. Andrews. The various types of knives designed for sampling baled woodpulp will now be known as the T. M. I. Andrews Pulp Knives.

Clinton Corn Processing Co. has promoted R. H. Jackson to general sales manager of its eastern division. Mr. Jackson, who has been with Clinton since 1939, will continue to make his headquarters at 625 Madison Avenue, New York, N. Y. He succeeds L. D. "Don" Buhrer who now becomes regional vice president of Fleischmann Malting Co., in charge of sales for the eastern district. Both Fleischmann and Clinton are divisions of Standard Brands, Inc.

In another Clinton promotion, R. H. Boegel becomes district manager in charge of the Philadelphia territory. He has been with Clinton since 1947.

Yale & Towne Manufacturing Co., Philadelphia, Pa. have advanced Frederick S. Miller to manager of Worksaver and Warehouser sales for Yale Materials Handling Division. Mr. Miller has been serving an assistant sales manager of the two product lines since early 1956.

Boler Petroleum Co., specialists in waxes and coatings, announces the opening of their new offices and laboratory in the Boler Building, 119 Coulter Ave., Ardmore, Pa.

Cady
UNIFORM PRESSURE
Burst Strength Tester

For Papers or Boards

This instrument meets ASTM and TAPPI standards; also CCC Rule 41 (Cady or Mullen Test), with a record of more than 30 years service in the paper and board industry. Uniform pressure during 12 second cycle assures uniform test on papers or boards. Pressure registers in pounds per square inch on direct reading dial, and remains at reading until next test is stated. Write for complete brochure describing operation in detail.

Burst Testers • Micrometers
Basis Weight Scales

E. J. CADY & COMPANY
MANUFACTURERS
676 North Harlem Ave., River Forest, Illinois

R. T. Browning

H. W. Bartlett

Wallace Tiernan Inc., Belleville, N. J. has named Robert T. Browning as executive vice president. He will assume his new duties on January 1. Mr. Browning has been associated with Wallace & Tiernan Inc. since 1930, starting as a field engineer selling chlorination equipment. For the past four years he has held the position of vice president, directing the sales activities of the company's three chemical divisions and the sales and engineering activities of the five equipment divisions and subsidiaries.

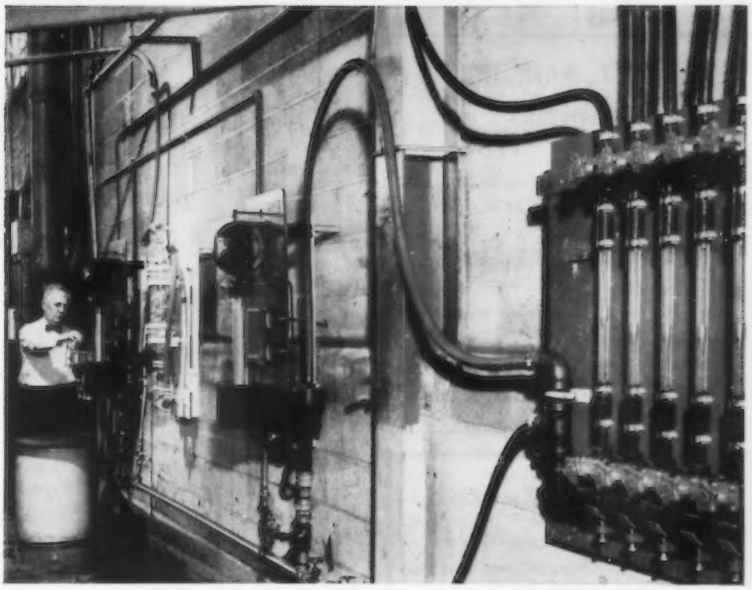
Pennsylvania Industrial Chemical Corp. has appointed Howard W. Bartlett manager of paper chemicals. Under the direction of Picco's vice president and chemical director. Dr. P. O. Powers, Mr. Bartlett will supervise paper industry projects in the plant's Clairton, Pa. laboratories, and coordinate technical service through Picco's sales offices. He formerly was technical and production superintendent for J. & J. Rogers Co.

Morningstar, Nicol, Inc. and Federal Adhesive Corp. both of New York City, mutually announced the affiliation of their companies effective October 9.

Morningstar operates a subsidiary, Paisley Products, Inc., manufacturers of industrial and packaging adhesives, polyvinyl acetate resin emulsions and many chemical specialties. This new Federal acquisition is in a similar line of business, manufacturing specialty adhesives, including a manufacturing affiliate in Baltimore, the Adex Manufacturing Co. The affiliation includes Federal Latex Corp. and Federal Chemicals Corp.

Marathon Electric Manufacturing Corp., Wausau, Wis. has appointed Rudy P. Salzman Western Central regional sales manager. He will operate from regional offices in Indianapolis and Chicago. He was formerly regional manager for Indiana.

Hankison Corp., Pittsburgh, Pa., has appointed Edward J. Whalen Jr. sales engineer in its main office and plant.



Mr. Albert Jacobs, Plant Supt., inspects W&T Slime Control Equipment at Electric City Paper Mills, Inc., N. Tonawanda, N. Y.

W&T CHLORINATION SYSTEMS

offer complete Slime Control

Electric City Paper Mills, Inc. recently installed new W&T chlorination equipment and eliminated slime in their paper machines. They report, "For years we have been troubled with a very bad slime condition and have spent a considerable amount of money trying to eliminate it. Not until we installed W&T equipment did we realize complete slime control. This has been accomplished at a saving in cost to us of more than 50%. Not only did we save money but we are getting desired results."

Whether you operate a paper or board mill, or a chemical plant, moderately priced W&T Chlorinators like those shown installed at Electric City Paper Mills can control water slimes in your processes. For more information send for Bulletin #I-56.

WALLACE & TIERNAN INCORPORATED

25 MAIN STREET, BELLEVILLE 9, NEW JERSEY

HOW TO DETECT 3 PARTS CHLORINE IN A MILLION PARTS AIR

New W&T Solvay Chlorine Detector*

detects as little as 3 p.p.m. chlorine in a continuous air-stream sample. Automatically sets off alarm at higher concentrations.

Write for Publication 50.118

WALLACE & TIERNAN
INCORPORATED
25 MAIN ST., BELLEVILLE 9, N. J.

I-55 *Manufactured under patent license from Solvay Process Div., Allied Chemical & Dye Corp.

CHAS. T. MAIN, INC.
ENGINEERS
Process Studies, Design Specifications and Construction Supervision
PULP AND PAPER MILLS
Steam, Hydraulic and Electrical Engineering Reports, Consultation and Valuations
80 Federal Street Boston 10, Mass.

Stadler, Hurter
& Company
CONSULTING ENGINEERS
Specializing since 1923 in all phases of design, modernization and expansion of pulp and paper mills from forest to finished product.
HEAD OFFICE: 1501 St. Catherine St. W., MONTREAL
New York Office: 15 Moore Street

THE LUMMUS COMPANY
for over half a century
Engineers and Constructors
for Industry
PULP AND PAPER MILL DIVISION
design, construction, reports, consultation
New York, Chicago, Houston
Montreal, London, Paris, The Hague

G. K. Boger

R. P. Calvert

Amalgamated Chemical Corp., Philadelphia, Pa. announces the appointment of George K. Boger, Jr. as technical director, Paper Chemicals Division. Mr. Boger was previously employed as technical and production assistant to the vice president in charge of manufacturing at Paper Products Manufacturing Co., Swarthmore, Pa. Prior to that he served as chemist with Hamilton Paper Co., Miquon, Pa The company manufacturers dispersants, felt washing compounds, slime control agents, antifoaming compounds as well as floculents.

John W. Bolton & Sons and The Emerson Manufacturing Co. Division of Lawrence, Mass. have appointed Robert P. Calvert of Fairlawn, N. J. sales representative for New York State.

He previously spent five years with Continental Paper Co. in their purchasing department.

General Aniline & Film Corp. has announced that H. Alison Webb, manager of the Chatanooga, Tenn., branch and sales office, has been named assistant sales manager for dyestuffs and pigments. Mr. Webb joined General Aniline as a member of the sales office staff in the Charlotte, N. C. branch. He will now make his headquarters at the home office of the company's Dyestuff and Chemical Division, 435 Hudson St., New York 14, N. Y.

LOCKWOOD GREENE
ENGINEERS
Services To The Pulp & Paper Industries
Plant location studies • Plant Design • Expansion
Design of power & steam plants • Water • Waste
Supervision of construction • Appraisals & reports
NEW YORK 17, N. Y. 41 East 42nd Street
BOSTON 16, MASS. 316 Stuart Street
SPARTANBURG, S. C. Montgomery Bldg.

OBITUARIES

George M. Lawrence, 57, manager of sales for the Dayton, Ohio sales office of Mead Papers, Inc., died October 4 after an illness of several months.

Mr. Lawrence had been associated with the paper industry for about 37 years, all of which were in the Dayton area. Before joining Mead as a salesman in 1946, he was employed for 25 years by the Oxford Miami Paper Co., West Carrollton, Ohio. He was appointed sales manager of Mead's Dayton sales office in 1954.

Jesse H. Neal, 83, a former general manager of the American Paper & Pulp Assn., died October 7 of a heart attack at his home in Dunedin, Fla. Prior to his employment with A.P.P.A., Mr. Neal was for ten years executive secretary of Associated Business Publications.

Col. William H. Eaton, U. S. Army, Reserve (Ret.), 78, chairman of the board of the Eaton Paper Corp., died in Pittsfield, Mass. General Hospital October 8. He became affiliated with the family paper company in Pittsfield in 1899. In 1927 he was named president of the corporation.

In the paper industry he was widely known for his efforts in perfecting the paper for use in air mail and his company was the first to market this product which is still one of the leaders in its field.

Karl M. Thorsen, 68, pulp and paper executive, died at Raiford Memorial Hospital in Franklin, Va. October 4 after a heart attack. He had been general superintendent of the Camp Mfg. Co.'s Franklin plant since 1937 and was one of Camp's vice presidents. He retired in 1954.

Roy L. Miles, a box engineer affiliated for many years with the Associated Box Co. of Lawrence, died October 11 at his home in Wakefield, Mass.

Stuart Irvine, 60, president and general manager of the Saniwax Paper Co., Kalamazoo, Mich., was found dead of a gunshot wound in his home in Lansing, Mich. on September 28. Death was attributed to suicide. He had been under a doctor's care and recently was a patient at a clinic in Milwaukee. He had been head of the Saniwax Paper Co. since the passing of his father, George L. Irvine, in 1934.

. . . from woodland appraisal to full-scale production . . .

STONE & WEBSTER ENGINEERING CORPORATION

offers complete integrated services to the pulp and paper industry

Successful producers in the world of pulp and paper appreciate the wisdom of employing a single organization capable of handling the multitude of complex problems entailed in the expansion of today's operations. Does the woodland property warrant further exploitation? . . . What returns can be expected? . . . Where should a new plant be built? . . . How much capital would be needed?

Stone & Webster Engineering Corporation is equipped to solve these problems and many others, ranging from water rights and labor supply to financial and tax agreements.

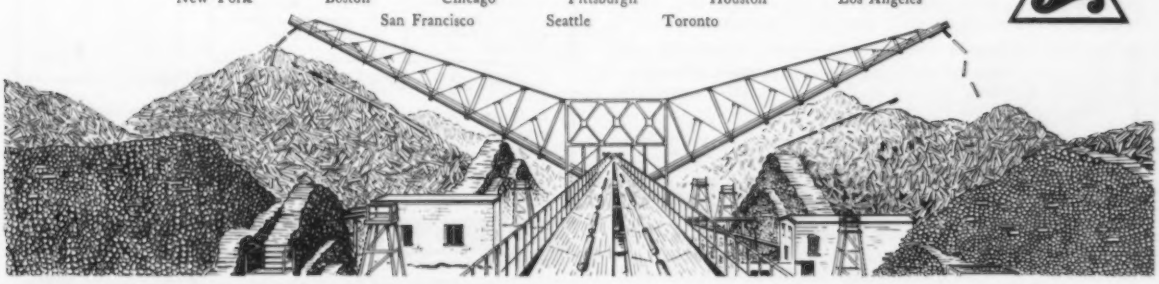
When the time comes for engineering design and drafting, procurement of materials, site preparation and final construction, Stone & Webster experience and working knowledge of all phases of your operation assure you that each requirement will be satisfied efficiently, economically, and expeditiously.

Write or call us for a copy of our booklet, "How Stone & Webster Engineering Corporation Can Help You."

STONE & WEBSTER ENGINEERING CORPORATION

A SUBSIDIARY OF STONE & WEBSTER, INC.

New York Boston Chicago Pittsburgh Houston Los Angeles
San Francisco Seattle Toronto



WEYERHAEUSER

BLEACHED SULPHITE
KRAFT CONTAINER BOARD

BLEACHED SULPHATE
BLEACHED KRAFT PAPERBOARD

---

*Microlyzed** JORDAN FILLINGS

Your Quality Guarantee

BOLTON EMERSON

LAWRENCE, MASSACHUSETTS

Send for Bulletin F-556 *T.M. APP. FOR

Westvaco Quality Papers

Westvaco manufactures a wide range of high quality paper products—from fine printing to rugged converting papers. All of these papers are made from virgin chemical pulps to precise standards of uniformity and quality—Westvaco's guarantee of top performance.

Printing Papers . . . Coated and uncoated letterpress, coated and uncoated offset, and gravure.

Writings . . . Bond, mimeo, duplicating, ledger.

Bristols . . . Index, post card.

Converting Papers . . . Label, tablet, envelope, lining, file folder, tag, tabulating card, coating raw stock.

Bleached Boards . . . Cup, milk bottle, folding boxboard, frozen food container.

Kraft Papers . . . Bag, multiwall sack, envelope, asphalting, impregnating, waxing.

Containerboard . . . Linerboard and corrugating medium.

Market Pulp . . . Bleached and unbleached sulphate.

West Virginia Pulp and Paper Company
230 Park Avenue, New York 17, N.Y.
35 East Wacker Dr., Chicago 1, Ill. • 503 Market St., San Francisco 5, Cal.

Magnus "Steels" the Market with 3 ALL STAINLESS Screen Plate Designs

AT MAGNUS you can get the chrome-nickel-steel screen plates best suited to your needs:

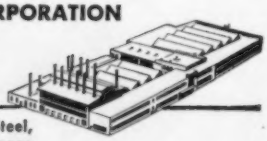
1st, there's the THIN SHEET fabricated plate that eliminates relief milling and with recommended arrangement, substantially increases present screening capacity.

2nd, there's the ¼" MAGNUS SOLID PLATE—almost twice as thick as any other one-piece stainless steel plate available today, with correspondingly higher strength and longer life, adaptable for installation on any type of screening equipment.

3rd, there's the new 5/32" MULTI-SERVICE PLATE—stronger than bronze, with long-lasting, sharp-edged slots and the corrosion resistance of 100% stainless steel construction.

MAGNUS is your best source for all types of screen plates—stainless, inconel, or bronze—for flat or rotary screens. Write us for complete information.

MAGNUS METAL CORPORATION
Fitchburg, Mass.
Metalworkers for the Paper Trade



SCREEN PLATES: Chrome-Nickel-Steel, Inconel, and Bronze
VALVES: Gate, Swing Check, Blow, Globe, Angle and "Y"

COMPLETE ENGINEERING AND CONSTRUCTION SERVICES FOR THE PULP AND PAPER INDUSTRY

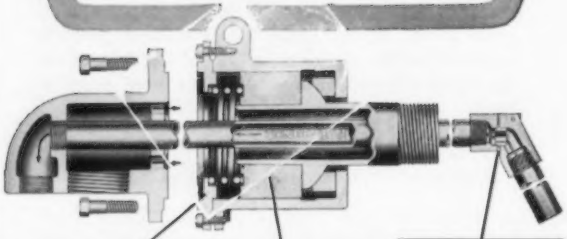
- **Design and Construction of Pulp and Paper Mills**
- **Steam and Hydro-Electric Power Plants**
- **Power Studies**
- **Reports and Appraisals**
- **Recovery Plants, Extensions and Alterations**

Send for our booklet, "Engineering, Design, Construction for Industry" Address Dept. O, Ebasco Services Incorporated Two Rector Street, New York 6, N. Y.

ENGINEERS · CONSTRUCTORS · EBASCO · BUSINESS CONSULTANTS

NEW YORK · CHICAGO · DALLAS · PORTLAND, ORE.
SAN FRANCISCO · WASHINGTON, D. C.

Johnson Joint
SELF-SUPPORTED TYPE with SYPHON ELBOW



ASSEMBLY PLATE — Holds internal parts in position when head is removed.

SELF-SUPPORTING — Needs no external supports of any kind.

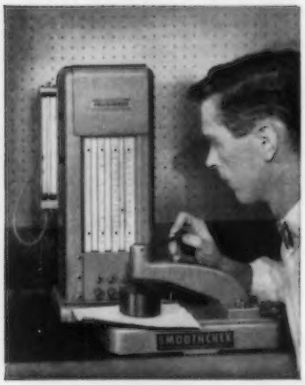
SYPHON ELBOW — Permits use of straight pipe for syphon. Can be inserted or withdrawn right through the joint.

WRITE FOR INFORMATION

Bulletin S-2001 has all the facts on this joint-and-elbow combination that supports itself, has no packing, needs no lubrication, outmodes unwieldy syphon pipes. Johnson Joints are also available in pipe-supported and rod-supported types, to suit all operating needs.

The Johnson Corporation
828 Wood St., Three Rivers, Mich.

PAPER SMOOTHNESS



Checked Instantly

The Sheffield Paper Smoothness Tester and its companion the Sheffield Porosity Tester quickly provide accurate information for the makers and users of paper. After two years of service, these testers have been instrumental in reducing complaints about paper finish and have proved to be a sound basis for specifying paper finish.

It requires no special skill or training to operate these precision testers. A smoothness test can be made as easily and as quickly as gaging the thickness of a sheet of paper. Another similar tester checks porosity in much the same manner.

For full details—and a 30 day free trial, write the **Sheffield Corporation, Dayton 1, Ohio, U.S.A., Dept. 46**

the SHEFFIELD corporation
measurement and measurement for mankind

7824

PRICE & PIERCE
LTD.

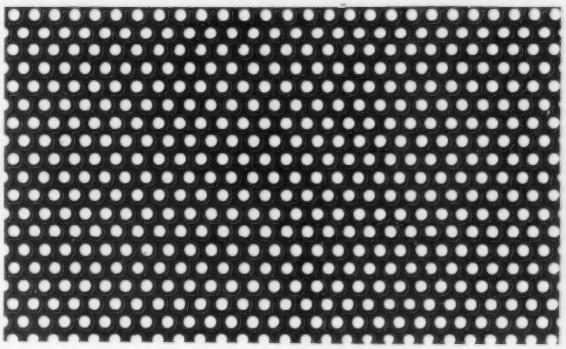
WOODPULP

PAPER

LONDON
27 CLEMENTS LANE

NEW YORK
60 EAST 42nd ST.

MONTREAL
SUN LIFE BLDG.



The Paper Industry Picks Perforated Plate ... by Hendrick!

Original equipment manufacturers of machinery for the paper industry choose Hendrick when specifications call for Perforated Metal Plate. Ideal because of its excellent filtering and draining characteristics, Hendrick Perforated Plate is available in commercially rolled metals and gauges to meet your most exacting requirements. For more details write to Hendrick, today!

Hendrick MANUFACTURING COMPANY
77 DUNDAFF STREET, CARBONDALE, PA.
Perforated Metal • Perforated Metal Screens • Wedge-Slot Screens • Wedge Wire • Architectural Grilles • Mitco Open Steel Flooring—Shur-Site Treads • Armorgrids • Hydro Dehazers • Petrochemical Column Internals

PRACTICAL PAPER TECHNOLOGY

This book begins with a survey of "Progress in the Paper Industry" and ends with a list of books recommended for collateral reading. The intermediate chapters are entitled: "How to Judge Paper"; "Physical Aspects of Paper"; "Practical Manual and Visual Tests"; "Essential Facts About Papermaking"; "Coated, Glazed and Specialty Papers"; "Permanence of Paper"; "Paper Difficulties in Converting"; "Paper as a Medium for Printing"; "Letterpress Printing"; "Offset Lithography"; "Intaglio Processes."

Also a Supplement containing a Quiz Test on paper.

Practical Paper Technology, Price $1.75
Foreign Delivery—25c extra

Lockwood Trade Journal Co., Inc.
15 WEST 47th ST. NEW YORK 36, N. Y.

"a brush is a brush is a brush"

Specify Jenkins' METLKOR — the original — the best *Metal* Core brush

METLKOR®
CYLINDER BRUSHES
and **LIFEWOOD®**
WOOD BACKED BRUSHES

Poetically speaking, true, but there's no brush like a Jenkin's METLKOR Brush. Paper Mill men everywhere say it's true. There are "Look-Alikes", "Just-as-Goods", "Steals", "Terrific Bargains" but only one Jenkins' METLKOR. They are built better to perform better to last longer. Result . . . Improved product, greater satisfaction and economy.

M. W. JENKINS' SONS, INC.
Serving Industry for 80 Years
341 Pompton Ave., Cedar Grove, Essex County, N. J. CEnter 9-5150

Supplying Your Requirements

CUT COST
USE PULP SUBSTITUTES

WASHINGTON, D. C.
CAMDEN, N. J.
NEW YORK, N. Y.

THOMAS PAPER STOCK COMPANY
1500 No. Hooker Street • Chicago 22, Ill.

Help Wanted

WANTED

Manager for kraft and sulphite pulp and paper mill; superintendent Cylinder wet machine mill; and many others.

CHARLES P. RAYMOND SERVICE, Inc.
Phone Liberty 2-6547
294 Washington St. Boston 8, Mass.
O-21

WANTED

BOARD MILL SUPERINTENDENT

for an

EASTERN SEABOARD MILL

One Machine, Narrow Trim, Steady Runs, Lined Boards. State age, experience, and previous record of employment.

Reply Box 57-282 care Paper Trade Journal.

O-28

MECHANICAL ENGINEER

Nationally known Paperboard and Folding Carton firm has opening for graduate mechanical engineer. Major responsibility will be supervision of small engineering staff under direction of plant Engineer on projects including estimating, design, selection and installation of machinery, equipment and process piping as well as building repairs and alterations.

Experience in Paperboard Industry desirable. Location convenient to northern New Jersey. Benefits include hospitalization, group insurance, retirement, etc.

Salary commensurate with experience and ability. Reply stating age and present salary to Box 57-285, care of Paper Trade Journal.

O-21

CONVERTING SUPT. — For Tissue and Towel Converting operations. Must have mechanical and managerial qualifications, also ability to work on new product development. Apply to Box 57-281 care Paper Trade Journal.
O-28

Help Wanted

PAPER MEN

$5,000 to $50,000

SALES—PRODUCTION—TECHNICAL

Top mills, converters, and jobbers from Coast to Coast badly need qualified men at every level. Choice spots open in pulp, board, coarse, fine, folding, corrugated multi-wall bags, transparent packaging and paper specialties of all kinds.

I am a paper man myself. If your record of performance entitles you to increased responsibility and greater potential, I can and will help you to attain it. You may contact us in absolute confidence.

GEO. M. SUNDAY & ASSOC.

Personnel Consultants to the Paper Industry
6 E. Monroe, Chicago AN 3-1970 TF

HELP WANTED

Retired pulp and paper mill supervisory personnel in major producing areas (Lake States, South East, South West, North East, etc.) for interesting part time work. No selling, demonstrating or servicing involved. Apply to Box 57-250 care Paper Trade Journal.

TF

MAINTENANCE FOREMAN

We are looking for a man with practical paper mill experience to fill this new position in our Maintenance Department. Must also be capable of supervising work of other maintenance crafts. Previous supervisory experience desirable but not absolutely necessary. Submit complete information to —

Personnel Department

RIEGEL PAPER CORPORATION

Acme, N. C. N-4

MACHINE TENDERS BACK HANDS

FOR NEW ONE HUNDRED TON PULP AND PAPER MILL NOW NEARLY COMPLETED IN CENTRAL AMERICA—NEW SPECIAL 158 INCH RICE-BARTON FOURDRINIER PAPER MACHINE—EXCELLENT OPPORTUNITIES—TOP SALARIES —U. S. TAX EXEMPT—PLEASANT HEALTHY LIVING CONDITIONS—NEAR BEAUTIFUL LARGE BEACH RESORT AND AMERICAN COLONY—PLEASE SUBMIT RECORD OF TRAINING AND EXPERIENCE—ALSO PLEASE BE SURE TO STATE SALARY DESIRED AND INCLUDE TELEPHONE NUMBER IN FIRST REPLY—ALL REPLIES HELD IN STRICT CONFIDENCE.

ADDRESS BOX 57-253 CARE PAPER TRADE JOURNAL. O-21

FOR SALE

CONTENTS OF NIAGARA FALLS, N. Y. MILL OF CERTAIN-TEED PRODUCTS CORP.

6—Dilts 1500# Iron Tub Beaters
2—N&W Mamouth Jr. and Monarck Jordans
2—Impco 12 Plate Flat Screens with Dunbar drives and S.S. Braemer Controls
4—Triplex Stock Pumps
1—47" Carthage 4 knife Chipper

100" SINGLE CYLINDER MACHINE

WET END SECTION

1—Single cylinder wet end consisting of a Downingtown Iron End Vat, Cylinder 48" dia. x 99½" face, Rubber Covered Couch Roll 18" dia. x 104" face. Both the Cylinder and Couch are anti-friction bearing equipped. There is also a felt guide, Broughton Shower and a spare cylinder and spare couch roll.

SUCTION FELT ROLL

1—Sandusky Suction Press Roll 14 9/16" dia. x 104" drilled face.

PRESS SECTIONS

2—Complete press sections. Each section has a top press roll 18" dia. x 98½" face Stainless Steel Metalized and the bottom rolls are 18" dia. x 98½" face Rubber Covered. These sections are complete with Lodding Doctors, felt carrying rolls and each is driven by a Falk totally enclosed right angle drive rated at 6 HP, 6.236-1 Ratio. Also included are four spare press rolls.

DRYER SECTION

1—24" dia. x 94½" face lead dryer
41—48" dia. x 94" face dryers
This section is complete with two deck frames, gears, bearings, steam joints and 14 Lodding Doctors. These dryers were all in operation at 54# steam pressure.

CALENDER STACK

1—94" face Six Roll Stack of the Open Way Type. The bottom roll is 16" dia., two rolls are 12" dia. and three rolls are 7" dia.

REEL

1—Downingtown Two Bowl Reel which will accommodate 60" dia. rolls.

SLITTER AND REWINDER

1—Warren Two Drum Slitter and Rewinder which will rewind to 60" dia. This machine is equipped with six sets of shear cut slitters and is complete with D.C. variable speed motor drive.

DRIVE

1—Louis Allis Dynomatic Corp. 75 HP Variable Motor Drive 440/3/25 with adjustable Speed Motor Clutch 1400 rpm-200 rpm.
Complete line shafting with pulleys, pillow blocks, hangars, etc., along with all Right Angle Marshall Drives for the entire machine are available.

ALL OF THE ABOVE OFFERED INDIVIDUALLY

ROSS PAPER MACHINERY CO.
265 PASSAIC ST.
NEWARK 4, N. J. HU 2-2177
TF

BEATERS
2—1500 lb. rag beaters, Valley Iron, bandless rolls, 54" x 48", cast iron tubs.
1—Bertram beater, roll 72" dia. x 63" face, hollow mid-feather, cast iron tub.

CALENDER STACKS
1—3 roll 30" face friction Calender Stack (Holyoke), 2 iron rolls, 1 cotton roll and 1 spare cotton roll.
1—3 roll 84" calender stack.
1—4 roll 72" Calender Stack. (Extra heavy duty).
1—5 roll 82" face.
1—5 roll 86".

CHIPPERS
1—96" Murray 4 knife Chipper—anti-friction bearings.
1—84" 10 knife Carthage chipper-anti friction bearings.
24—Chipper Knives 15⅞ x 8¾, 2 slot.

CLASSIFINER
1—Dilts Classifiner, practically new.

CONVEYOR
1—Corrigan slush maker conveyor, 72" wide.

CRUSHER & HAMMERMILL
1—Murray Chip Crusher.
1—Jeffrey Hammermill (18" dia. rotor).

CYLINDER MOLDS
5—36" diameter x 94" face, 12" diameter hollow shafts. Very good condition.
1—42" diameter x 134" face with anti-friction bearings.
2—30" diameter x 72" face.
1—30" diameter x 92" face.
1—36" diameter x 84" face.
2—36" diameter x 110" face.
3—36" diameter x 90" face, 18" diameter couch rolls.

DIGESTERS
1—Biggs 12' 6" (Globe).
Write us regarding your requirements.

DRIVES
1—Rice-Barton hypoid enclosed drive, 4 to 1 ratio.
1—#6 Reeves horizontal—anti friction bearings, totally enclosed.
1—#6 Reeves vertical-anti friction bearings, totally enclosed.
1—Sandy Hill right angle 50 H.P. (4.75 to 1)
1—Farrel Birmingham enclosed drive, 200 H.P. anti friction bearings, 5.45 to 1, new equipment.
1—Jones 21 H.P., ratio 10 to 1 (enclosed angle drive).
1—#4 Reeves Drive.
1—#4 Reeves Drive, totally enclosed, Class E, with 25 H.P. splash proof motor.
2—Waterbury Hydraulic Variable speed line shaft drives (from 40 to 100 H.P.).
3—Rice Barton enclosed drives, double reduction (14 to 1 one end, 4 to 1 other end).
1—Beloit hypoid enclosed drive 60 h.p. 5 to 1 ratio.

DRYERS
1—28" diameter x 84" face.
2—30" diameter x 48" face, with bearings.
2—30" diameter x 40" face, with bearings.
60—36" diameter x 84" face, complete with frames, gears & bearings.
4—48" dia. x 52" face with frames, gears, bearings.
4—28" diameter x 80" face with anti-friction bearing.
1—36" diameter x 44" face.
5—36" diameter x 76" face.
6—36" diameter x 80" face.
12—48" diameter x 88" face, with frames, bearings and gears.
36—42" diameter x 118" face, complete.
22—28" diameter x 40" face with frames, gears and felt rolls.
1—16" diameter x 54" face (steel.)
1—48" diameter x 66" face.
1—60" diameter x 89" face, frames and bearings.
6—48" diameter x 130" face.
2—Cooling Drums, brass, 36" x 128", with frames, gears and necessary rolls to make up the unit. (After dryers)

DYNOFINER
"Rice Barton," details on request.

EMBOSSING CALENDERS
1—43" 3-Roll Embossing Calender.
1—45" Meadows 2 roll embosser.
3—62" 2 roll embossers.

EXTRACTOR ROLL
1—Extractor roll, 26" diameter x 104" face.
1—Rice Barton & Fales, Extractor Roll, 26" diameter x 104" face.

FELT CONDITIONERS
1—Scofield, 90" face.
1—Scofield, 125" face.

FELT ROLLS
50—Brass Felt Rolls, with Brass Journals, 72" face x 5" dia.

FLAT SCREENS
6—IMPCO—Dunbar 14 plate, bronze vats.
1—8 Plate "Packer".
1—12 Plate "Packer".

GEARS
Write us regarding your requirements.

HYDRAFINER
1—Dilts, stainless steel filling, anti-friction bearings, excellent condition.

HYDRAULIC PRESS
1—750 ton hydraulic pulp press.

JORDANS
1—Noble & Wood mammoth.
Write us regarding your requirements.

KNIFE GRINDER
1—Rogers 128" knife grinder.

LABORATORY EQUIPMENT
1—Ball Mill
1—Electric oven (Williams Standard Pulp Testing Apparatus)
1—2' Shartle Hydrapulper.
1—36" Somat Pulping Machine.
1—Colloid mill.
1—6" x 6" sheet mold.
2—8" x 8" sheet dryers.
1—12" x 12" sheet dryer.
1—Schopper fold tester.

LAMINATING MACHINES
1—72" Beloit laminator, complete with drive.
2—84" Asphalt laminators.

MISCELLANEOUS
1—#1 Miami Selectrap.

MOTORS
2—100 h.p. G.E. Upright—1180 r.p.m.
1—300 h.p. Slip Ring Motor—500 r.p.m.—Rebuilt.

PASTER
1—117" 5 ply Downingtown paster

POPE REEL
Write us regarding your requirements.

PRESS ROLLS
2—Chilled iron, chrome plated 9" x 72".
1—Chilled iron, chrome plated 14" x 72".
1—Chilled iron, chrome plated 12" x 100".
1—Chilled iron, chrome plated 10" x 74".
8—sets (1 rubber, 1 chrome steel) 74" face x 15" dia., complete with bearings.

PULLEYS
Various cone and assorted pulleys.

PULPERS
1—36" Somat pulping machine.
Write us regarding your requirements.

PUMPS
2—Five stage Centrifugal Boiler Feed Pumps, 160 g.p.m., 1025 ft. head.
1—Morris-10,000 g.p.m. 25 ft. head (all bronze).
1—Shartle Circulating Pump.
Various sizes. Centrifugal and Plunger Pumps.

RAG CUTTERS
Write us regarding your requirements.

REELS
1—86" 2 bowl reel.
1—84" 3 bowl revolving reel.
1—100" Rice Barton 2 bowl Reel, heavy duty.
1—123"—3 bowl Revolving Reel.
1—134"—2 drum.
1—72" Dowingtown Reel, 2 bowl.
1—84" 2 bowl (72" diameter rolls).

REFINERS
1—12" Wiener Refiner.
1—#2 Claflin refiner.

REGULATOR
1—Bird Consistency Regulator.

ROLLS
Felt, Table, Press, Breast, Couch, etc. Various sizes and types. (Bronze, Rubber, Iron, etc.)

ROTARY SCREENS
1—#1A Bird, copper vat.
2—APMEW Rotary Pulp Screens.

SAVEALLS
1—#5 Bird Saveall.
1—LaMorte, 48" diameter x 82" face cylinder molds.

SCREEN PLATES
Bird Rotary screen plates.
Write us regarding your requirements.

SHEETERS
1—78" Moore & White Co. Sheeter (Simplex), layboy and 6 roll backstand.
1—132" Hamblet heavy duty duplex sheeter, anti-friction bearings throughout, including layboy and backstand.

SHOWERS
Write us regarding your requirements.

SHREDDERS
1—16" "Swift" Paper Shredder.
Write us regarding your requirements.

SLITTERS & WINDERS
1—32" Cameron Type 9.
1—42" Cameron Type 9.
3—42" Cameron Type 6.
1—42" Cameron Type 26-2A.
1—50" Cameron Type 6.
1—62" Cameron Type 10-10.
1—82" Cameron Type 10, rebuilt (like new), anti friction bearings, 36" rewind.
1—157" Cameron Type 18.
1—40" Fales Slitter.
1—86" Two Drum Moore & White 50" diameter rewind.
1—120" Moore & White 4 drum winder.
1—96" 4 drum Moore & White winder.
1—84" Waldron winder (50" rewind)

SLITTING DEVICE
84"—Quick change slitting device shear cut, complete, practically new.

STEAM JOINTS
18—3" Johnson steam joints (new).

STOCK MAKER
1—Morden Stock Maker (with motor).

STOCK PUMPS
1—Union centrifugal stock pump, 4" x 6", all bronze, with totally enclosed motor.
1—8 x 18 Shartle Triplex.
1—10 x 20 Shartle Triplex.

SUCTION BOXES
Write us concerning your requirements.

SUCTION COUCH SHELL
1—Downingtown suction couch shell only, 127½" face x 26" diameter.

SUCTION COUCH ROLLS
1—30" diameter x 154" face.
1—36" diameter x 246" face, SKF bearings.
1—Sandusky Suction Couch Roll 18" diameter x 98" face.
1—Sandusky Suction Couch Roll 108" face x 24" diameter, including spare shell.

SUCTION FELT ROLLS
1—Gilbert & Nash 122" face.
1—Beloit Rubber Covered Suction Felt Roll 109" face x 20½" diameter.

SUCTION PRESS ROLL
1—Downingtown, rubber-covered 85" face x 20" diameter (complete with vacuum pumps).

SUPER CALENDER STACK
1—9 Roll 56".

TABLE ROLLS
22—Rubber Covered 10" diameter x 246" face.
30—4" dia. x 130" face (will cut to size).

TANK
1—Solvent Recovery Tank, 21 ft. long x 7 ft. diameter.

THICKENERS
5—36" x 100", stainless steel vats.

TOILET WINDERS
2—72" Hudson-Sharp (Surface type winder).

TRIMMERS
Write us regarding your requirements.

TURBINE GENERATOR SET
1—150 kw General Electric.

VACUUM PUMPS
1—#6 Nash hytor.
1—L-4 Nash vacuum pump.
1—L-5 Nash vacuum pump.
1—L-6 Nash Vacuum Pump.
2—L-8 Nash Vacuum Pumps.
1—K-4, motor equipped.
3—#1 Nash Hytor vacuum pumps.
1—#7 Nash Hytor, complete with 75 HP synchronous motor.
1—#4 Nash Hytor vacuum pump.
2—Connersville, 14 x 20.

VATS
2—D. J. Murray Co. Vats, iron ends, for 42" x 120" cylinder molds, overflow and counterflow.

WET MACHINE
1—72" Wet Machine.

YANKEE DRYERS
1—84" diameter x 56" face.
1—140" face x 12' dia. anti friction bearings & stands.
1—60" diameter x 89" face, frames and bearings.

Paddy Ross, Pres. **J. J. ROSS COMPANY** Ben Kurs, Treas.
377 Frelinghuysen Ave.* **Tel—Bigelow 3-3720** **Newark 5, N. J.**

Help Wanted

BETTER POSITIONS

$6000 to $50,000. Want a substantial salary increase, more opportunity or different location? This national 47 year old service connects you with best openings. You pay us only nominal fee for negotiations; This we refund when employer pays placement fee. Present position protected. In complete confidence, write for particulars. R. W. Bixby, Inc., 563 Brisbane Bldg., Buffalo 3, N. Y. 0-21

WANTED
EXPERIENCED PAPER MILL INSTRUMENT MECHANIC

We are engaged in a long range program to develop a radically improved paper machine. If your experience with pneumatic and electronic instrumentation in a modern news or kraft mill qualifies you, we need your help to install and maintain instrumentation and automatic controls in our experimental paper mill. You will also help with the pulping system, model testing, and alterations. This is a challenging opportunity for a top notch mechanic. We offer a 35-hour week, excellent salary and benefits. Please send detailed resume to:

Paper Group
Springdale Laboratories
835 Hope Street, Springdale, Connetticut 0-28

WANTED:

PRODUCTION MANAGER

Technical education. Practical experience. Fine paper. Write to Box #57-294, Paper Trade Journal giving full information.

N-25

MAINTENANCE SUPERVISOR

FOR PULP AND PAPER MILL. THIS IS A WONDERFUL OPPORTUNITY FOR A YOUNG MECHANICAL ENGINEER WHO WANTS TO LOCATE WITH A DYNAMIC COMPANY. ALL REPLIES CONFIDENTIAL. SEND RESUME TO EMPLOYMENT MANAGER

Sealright-Oswego Falls Corporation
FULTON, NEW YORK
0-21

WANTED

Experienced Paperboard Salesman with customer following to sell Paperboard and Paperboard Specialties for a well established Eastern Mill. Excellent opportunity for advancement. All replies kept strictly confidential. Our employees know of this ad.
Address Box 57-296 care Paper Trade Journal.
0-21

CHEMICAL ENGINEER

For the position of Assistant Technical Director in an Ontario Pulp & Paper Mill. Age under 35. Excellent opportunity for the right person. Address Box 57-293 care Paper Trade Journal.

0-28

Situations Wanted

POSITION WANTED

AT PRESENT TECHNICAL DIRECTOR AaA-1 COMPANY DIVISION OPERATING IN—

Non-ferrous foil rolling, extrusion, laminating, coating, vacuum metal evaporation.

Metals, papers, boards, films, adhesives, and colors.

Electronics, containers, and structural.

Military and commercial.

Technical and policy.

Wish to change; available for one or two days per week on permanent basis.

Box 57-208 care Paper Trade Journal. 0-21

DESIGN ENGINEER

Seven years experience in paper machine design. Seeking position as assistant to plant engineer in New England or eastern New York area. College graduate. Address Box 57-264 care Paper Trade Journal.

0-28

WANTED POSITION

Coating man, experience in production of synthetics, Laquers, glues, Caseins, starches, latex, coatings. Let me solve your coating troubles.

Box 57-290 c/o Paper Trade Journal.

TECHNICAL REPRESENTATIVE OR ADMINISTRATIVE ASSISTANT

PULP AND PAPER ENGINEERING DEGREE, PAPERMILL EXPERIENCE, EMPLOYED AS SALES MANAGER EQUIPMENT SUPPLIER. DESIRE CHANGE, NEW YORK CITY OR NEW ENGLAND LOCATION. ADDRESS BOX 57-289 CARE PAPER TRADE JOURNAL. 0-21

MILL MANAGER

17 years experience in the manufacture of Sulphite Pulp and all kinds of chemical writing and printing papers, including effective quality control and finishing operation and costs. Successful in handling production personnel. Prefer Middle West. Now employed.
Address Box Number 57-292
care Paper Trade Journal 0-28

MECHANICAL ENGINEER

Over 30 years experience in the pulp, paper and board industry as Plant Engineer, Chief Engineer and supervisory production positions. Qualified for engineering, construction and maintenance supervision. Mills and power plants. Invites correspondence.
Address Box 57-298 care Paper Trade Journal.
N-18

KRAFT CONVERTING SUPERINTENDENT—Broad experience in converting packaging and proper warehousing. Address Box 57-299 care Paper Trade Journal. 0-21

EXECUTIVE-WORKS MANAGER — Superior record in production organization, labor relations and development of new products in boards, papers and conversion. Seeking organization offering challenging opportunity. Diversified lines. Employed. Address Box 57-78 care Paper Trade Journal. O-28

SUPT. PRACTICAL PAPERMAKER can get top production and quality all fine and specialty grades News and Kraft. Can assume complete responsibility. Address Box 57-284 care Paper Trade Journal. O-28

BARGAINS

IMMEDIATE DELIVERY

1—145" Holyoke—9 roll Super Calender Stack.

1—66" Holyoke—9 roll Super Calender Stack.

1—80" Pusey & Jones—11 roll Calender Stack.

1—30" x 160" Farrel-Birmingham Roll Grinder. Factory rebuilt in 1954 at a cost of $18,500.00. New drives and latest type of equipment.

27—48" x 110" Bagley & Sewall Dryers.

21—48" x 82" Pusey & Jones Dryers.

6—48" x 88" Bagley & Sewall After Dryers.

1—120" Pusey & Jones 2-Drum Winder. Anti Friction Bearings.

1—110" Pusey & Jones 2-Drum Winder. Anti Friction Bearings.

7—14 Plate Impco Flat Screens, Bronze Vats, latest type, direct motor drives, S.S. Plates.

1—Waxing Machine, complete with Vilter Refrigeration Equipment and Drives.

1—Hamblet Roller Bearing Cutter—30 roll backstand. Serial No. 2282, Model 28, Fully Equipped.

1—Hamblet Layboy, Serial No. 1140, Fully Equipped.

1—Continuous Feed Metal Edging Machine. (New)

1—Brightwood Box Machine, 6" Model Automatic Rotary Feed, End Shredder (60 per minute), Complete.

1—Hudson Sharpe Wax Paper Converter, Serial No. 1507, Fully Equipped, trim 72".

1—84" Kamyr Machine Complete, 75 Ton per day.

1—25" Dia. x 156" Suction Couch Roll.

2—22" Dia. x 156" Rubber Covered Press Rolls.

2—84" Bagley & Sewall Wet Machines.

1—No. 2 Jones Pulper, Anti Friction Bearings. Spare Worm.

1—Cowls Hydraslusher Model 10 SD.

1—90 H.P. Terry Turbine. Type G-4000/1000 RPM. For Paper Machine Drive. Complete.

1—74" x 32" Saveall, complete with rubber suction couch.

1—8' x 10' Oliver Vacuum Filter.

2—Impco Pulp Screens.

2—No. 3 Impco Knotter Screens—S.S. Plates.

3—100 KVA Wagner Transformers, 4600-460.

1—24" x 6' Lodge & Shipley Geared Head, Heavy Duty Machine Lathe, Taper Attachment, Hollow Spindle, Motorized.

1—16" Steptoe Shaper—Motorized.

1—8 & 5 No. 2 Surface Grinder—Motorized. Gear Reducers, P.I.V. Drives, Gearmotors, S.B. Pumps, Etc. 1000 Electric Motors from ¼ H.P. to 600 H.P. In Stock.

The above is but a small part of the inventory we carry. We can furnish you with almost anything in the line of paper mill, electrical and machine shop equipment.

We also have a large inventory of new and used flanged fittings at all types at very low prices.

Write—Wire—Phone For Your Needs

RUDERMAN MACHINERY EXCHANGE

GOUVERNEUR, NEW YORK
Telephone 333-334

TF

FOR SALE

PAPER PULP MACHINES

1—152" Trim pulp drying machine. Head box stainless steel. Wire 164" x 80 ft. 18" breast roll. 25" suction couch. 6¼-7" table rolls. 5 suction boxes. 2-16" dandies. Beloit shake drive. 2 sets presses, rolls 24 x 158'. Felt conditioner. B & C enclosed drive 1st press. 1 dryer 26 x 160". 62 dryers 48 x 160". 2—48 x 160" pre heating dryers. Beloit duplex cutter. Lineshaft, prime mover. Pulp baling presses. Pump and spare parts. Production 190 tons/day pulp 7500#. Now operating.

2—88" Trim Fourdrinier paper machine. Speed 80-460. 3A Bird screen. Wire 102" x 65 ft. 22" suction couch, new 1941. 3 sets presses. Smooth press. 24 dryer 48 x 98". 2 stacks calenders. Reel. Cameron #18 winder 2100 FPM. Drives, line shaft, prime mover. 200 HP D.C. Reliance motor. Falk reducer rebuilt and rewound 1951. Beaters, chests, 9 pumps and spare parts. Grades Manilas, tag, Bristol, book drawing.

3—81" Trim 4 cylinder paperboard machine. Speed 50-225. Moulds 36 x 93" a.f. SKF. 18" diameter couches. C.I. end vats. 4 sets primary presses. 2 main and 1 smooth press. 32 dryers 36 x 87". 2 box frame calenders, 7 roll and 5 roll. Reel, winder, duplex cutter, variable and constant speed line shaft engine, beaters, Jordans and screens. Machine now operating.

4—81" Trim Fourdrinier pulp drying machine. Capacity 72 tons 500 lb. per day. Wire 104" x 80 ft. Suction couch. 3 presses 18 x 108". 34 dryers 48" diameter. Hamblet box frame cutter. Machine now operating.

5—72" Trim left hand Fourdrinier. Speed 450-750 ft. on weights 10-30. Wire 84" x 50 ft. Lip slice. Fourdrinier part rebuilt in 1939. Creping dryer 60 x 82". 20 x 80" suction press, a.f. Top roll 18 x 82". 20 dryers 48 x 80". Carrier ropes. 8 roll Beloit calender. Pope reel. 2 drum winder, drums 13 x 80", a.f. With variable speed motor drive. 3 Waterbury and 4 enclosed hypoid drives with prime mover. Also beaters, chests. Swen-Pederson Saveall. 10 pumps and spare parts. Now operating.

Frank H. Davis Company, Inc.

Box 231, Cambridge 39, Massachusetts
Telephone—Trowbridge 6-0365

N-4

FOR SALE

PAPERBOARD MACHINE

Six cylinder 79" trim right hand Paperboard Machine. Space required 220 ft. x 35 ft. Speed 50-300 FPM. Production 4500-5000 lbs. per hour. Vats Heresited with flow spreaders. Moulds 48 x 96", couches 18 x 92". all a.f. and new in 1948. Two whippers, extractor roll 24 x 98" with r.c. couch 18 x 98 a.f. and equipped with pneumatic loading. Suction couch 24 x 94" with 15" dia. rubber covered couch roll (new 1956). Two Black & Clawson primary presses 14 x 90", a.f. new 1955; three main presses, rolls 18-20 diameter x about 86" face, all 3 presses equipped with oscillating doctor, new 1955 a.f. Dryer section 1—24 x 84", 38—48 x 86" triple deck heavy Pusey & Jones frame, bronze lined bearings, Johnson joints, new Ross Al. hood; air ducts and Mid West Fulton drainage, new 1955. Two calenders 7 roll, box frame. Curl correction system, reel, duplex cutter and 2 drum winder for 2000 FPM variable drive. Pump vacuum L 70 K 5, stock and water, used with machine. Starch system, spare parts. Moulds, whippers and individual units of machine driven by separate Radicon enclosed motor reducer drive and these in turn by a 200 HP 720 rpm 150 KW 250 Volt D.C. M.G. Set with D.C. control panel, new 1948. Machine now operating and in good operating condition with exception of some surface marks which have shown up on a few dryer heads, owners have agreed to replace these with new heads. Can furnish more details, schematic sketch and pictures upon request.

FRANK H. DAVIS COMPANY INC.

BOX 231, CAMBRIDGE 39, MASSACHUSETTS
TELEPHONE—TROWBRIDGE 6-0365

N-4

For Sale

FOR SALE

38" Dexter Power Cutter.
24—Roll Hamblet Backstand.
54" Seybold Cutter.
34" Challenge Diamond Power Cutter.
44", 54", 62" Hamblet Sheeters.
Layboys & Backstands.
42" and 62" Cameron Slitters.
36" Waldron 2-drum Reel.

and many other items

Thomas W. Hall Co.,
Stamford, Conn.

TF

WASTE DISPOSAL DRYERS

3—Louisville 6' x 50' Rotary Steam Tube Dryers.
Priced attractively for quick sale.

BRILL EQUIPMENT COMPANY
2401 Third Ave., New York 51, N. Y.

0-21

FOR SALE
BIRD MODEL 100 ROTARY SCREENS

4—#3A non-ferrous construction, bronze plates .025 cut, copper vats, oscillating showers, two motors each.
5—#3A standard, inconel plates .018 cut, copper vats. Screen and flowbox "Lithcoated." Require 2 motors each.
1—#3A standard, bronze plates .024 cut, copper vat. Screen and flowbox "Lithcoated."
2—#3A standard, inconel plates .018 cut, S.S. vats. Screen and flowbox "Lithcoated."
2—#2A standard, bronze plates .028 cut, copper vats, W.W. showers, S.S. mix boxes, 2 motors each.

ROSS PAPER MACHINERY CO.
265 PASSAIC ST., NEWARK 4, N. J. TF

FOR SALE

Hudson Sharp, 31" width, 2 color Paper Aniline Press. Roll to roll. 5 yrs. old. $4000.00.

BEHRENS CENTRAL SALES CORP.
70 E. 45th St., New York, N. Y.
Tel. MU 6-5675 0-21

For Sale

USE
GENUINE
PARTS AND SERVICE
ON
ALL
SMITH & WINCHESTER
EQUIPMENT

The Smith & Winchester Mfg. Co.
South Windham, Conn.

0-21

REBUILT — GUARANTEED
NASH VACUUM PUMPS
In Stock, following sizes:
H-10, H-9, H-7, H-6, L-5, L-4, TS-7, #4, #2

Brill Equipment Company
2401 Third Ave., New York, 51, N.Y.
Cypress 2-5703

0-21

FOR SALE — ALL MAKES, MODELS, SIZES: Slitters & Rewinders; Sheeters; Coaters; Waxers; Die Cutters; Embossers; Printers; Laminators; Paper Box Equip. WRITE FOR "USED MACHINERY LISTINGS." We BUY and SELL Single Units or Complete Plants. GREGGORY INC., 203 N. Wabash Ave., Chicago, Ill. TF

FOR SALE—Windmoller and Holscher Matador Bag Machine, Model 31-A. Bag lengths up to 20" face widths to 11". Good condition. Address Box 57-287 care Paper Trade Journal. N-4

FOR SALE—Single Cylinder Machine complete including 2 sets presses, 54 dryers 36" x 80", calender stack, reel, winder and drives. Also 1200# beaters, jordan, pumps, flat screen, etc. This is a complete mill. For sale as a unit or individually. ROSS PAPER MACHINERY CO., 265 PASSAIC ST., NEWARK 4, N. J. TF

Wanted

WANTED
Job Lots of Paper & Paperboard
We need a substantial supply of odd lots, side rolls, obsolete surplus or damaged lots of paper. Will buy all grades, any quantity. MELROSE PAPER CO., INC., 208 Walnut St., Philadelphia 6, Pa. Market 0800 TF

Wanted

WANTED

KNOWLTON, OR SIMILAR TYPE SPIRAL WINDER WITH AUTOMATIC CUT-OFF SUITABLE FOR MANUFACTURING SPIRALLY WOUND CORES, FROM ¾" to 3" DIAMETER.

Anglo-African Shipping Co. of N. Y., Inc.
16 E. 34th St., New York 16, N. Y. 0-21

WANTED MACHINERY: BEASLEY FRENCH BAG MACHINE. Address Box 57-297 care Paper Trade Journal. 0-21

Mill Representation

MILL REPRESENTATIVE—Man with intimate knowledge manufacturing, finishing and converting, desires mill representation. Southern states only. Would consider sales position. Address Box 57-291 care of Paper Trade Journal. N-11

Manufacturers Representative

Mfgrs reps wanted for New England, New York (except Metropolitan area), Midwest and Canada for the world famous Bendtsen smoothness and porosity paper tester. Please send complete details to Box 57-295, NYC. (Exclusive Distributors, USA and Canada) 0-21

You Should Advertise in the

CLEARING HOUSE

FOR BUYER FOR SELLER
FOR EMPLOYER FOR EMPLOYEE

SECTION
of
PAPER TRADE
JOURNAL

BECAUSE—

the Paper Trade Journal carries more classified advertising than any other publication in its field.

It is read by leaders in the industry —men who buy—men who sell.

They are the ones who turn to the Paper Trade Journal when in need of used equipment or want to sell surplus equipment. They are the men who read the classified columns for efficient, competent help.

TRY IT—It will be well worth your while.

J. E. SIRRINE CO.
Greenville, South Carolina
Engineers
Established 1903

PAPER & PULP MILLS • WASTE DISPOSAL • TEXTILE MILLS • APPRAISALS • WATER PLANS • STEAM UTILIZATION • STEAM POWER PLANTS • HYDRO-ELECTRIC • REPORTS

LOOK

THROUGH THE COLUMNS OF THE CLEARING HOUSE YOU ARE BOUND TO SEE WHAT YOU NEED.

WE BUY

UNITED PAPER MACHINERY CORP.
58-70 WEST AVENUE
LOCKPORT, N. Y.
USED PULP and PAPER MILL MACHINERY

WE SELL

Entire Contents Thomas Phillips Company Paper Mill At Akron, Ohio FOR SALE BY OWNER

Write or phone for complete prices. All equipment at plant as is where is and subject to prior sale

SCREENS
#3A Bird, Copper Vat
#2A Bird, Copper Vat
Smythe 4-plate flat, with shaker

VATS
3—Downingtown Vats, C.I. Ends, cypress sides
3—42" x 86" cylinder moulds, a.f. bearings
3—16" Rubber couches
3—Sandusky Showers
1—Felt whipper and Sandusky shower
1—Suction box
1—Sandusky Suction Press

PRESSES
First and Second
2—Top, brass 15" x 84"
2—Bottom, rubber 15" x 84"
Horne Smooth press, pneu. controls (new 1956)

DRYERS
21—36" x 82" Downingtown, fr. bearings
1—Sandy Hill Breaker Stack w/in.-drive, pneu. controls (new 1957)
1—Stickle Tension Roll steam control system & controls (new 1957)
1—Stickle Vacuum Pump (new 1957)

CALENDERS
1—5 roll Downingtown 84" face
1—Set embossing rolls 9 lines to inch

REEL
1—2 drum upright

WINDER-SLITTER
1—Moore and White w/new (1956) electric drive

DRIVES
Mortise bevel gear corners
#7 ¾ Reeves w/75 HP motor

PUMPS
1—Nash Hytor vacuum 10 HP
2—Shartle 8" x 6"
3—Shartle 12" x 10" white water suction 20 HP
2—Harmain centr. 6" x 6" 800 gpm 40' Hd.

BEATERS
4—Downingtown Iron Tub 1200 lb., cement bottom, washers
1—Dilts 1000 lb.
1—Midwest 1600 lb., wedge type roll
1—Midwest 2500 lb., wedge type roll
1—Rotary Filter Screen
1—Rubber covered steel tank with PVC bleaching system, 1"

ROPE COOKERS
1—7000 lb. cap.
1—8000 lb. cap.

HOIST
1—Yale Electric and monorail system

BALER
Economy upstroke Style 172F5 (new 1956)

SAVE-ALL
1—Bird with couch and shower No. 5

MISC.
1—Cameron Rewinder 10-5A, 54", 36" dia. roll
1—Air compressor, 15 HP DeVilbiss
25—Broke boxes each with 4 b.b. casters
1—Bird Consistency Regulator, Stnls, w/ controls, cap. 2000# hr. (new 1956)
1—2000# Dial springless floor scale
2—Hand roll trucks
2—4 wheel trucks
1—Rope Duster 15 HP
1—Budgit 2 ton chain block
1—Horizontal caustic soda tank 6' x 8' steel
1—Battery Lewis Shepard Jackstacker 1500# cap. w/generator
1—Lewis Shepard 2000# hyd. pallet truck

LABORATORY
1—Schopper tensile tester w/strip cutter (new 1956)
1—Perkins Mullen Tester
1—Elmendorf Tear Tester
2—Thwing-Albert Basis Wgt scales
2—Gurley densometers (new 1957)
1—Macbeth Ph meter
1—Pelouze postal scale (5 lb. cap.)
1—Absorption tester
1—Brightness Tester, Photovolt

PUMPS, STOCK, HIGH CONSISTENCY
1—Shartle Duplex Plunger
1—Shartle Single Plunger
1—Shartle, Centrif. 2800 gpm at 20' hd.

PUMPS, WATER
1—Allis-Chalmers high pressure 2 stage 25 hp 150 gpm 3350 rpm
1—Louis Allis, 15 hp 100 gpm 3500 rpm
1—2" Single stage centrif. 5 hp
Also several low head high volume pumps
1 ea. Boiler feed pumps, steam and electric

MACHINE SHOP
1—Craftsman Double End Grinder, floor pedestal type, 1/3 HP motor 115 V., 3450 RPM
1—Craftsman 6" Jointer, 1 HP motor, 115 V., 3450 RPM
1—Craftsman Quick Change Gear Lathe, 52" bed, 1/3 HP, 115 V., 60 cycle, 1750 RPM motor
1—Atlas Bench Shaper with vise, ½ Hp, 110/220 V. 1 phase, 60 cycle, 1750 RPM motor
1—Jig Saw, floor pedestal type, 110 V. A.D. Motor
1—Prentice Bros. 18" Drill Press, 2 HP Link-weld motor 440 volt, 3 phase, 60 cycle, 720 RPM
1—Linewelder DC, 250, Electric Welding, 220 Volt, 3 phase 60 cycle, 3600 RPM motor
1—Alamite Volume Pump, model 6536
1—Acetylene Welding sets and fittings
1—Large Shop Vises
1—Large Anvils
2—Iron Hinged Pipe Vises, 1 large, 1 small
1—Tri-stand Pipe Vise
1—6" Swivel Vise
1—21" Drill Press with Vise, 2 HP 220/440 V. 60 cycle motor
1—Williams Pipe Cutter and Fittings. Dies 3" to 8", V-belt drive, 2 HP 440 V., 3 ph., 60 cycle, 1130 RPM motor

BOILER
Babcock & Wilcox 440 hp Sterling Type H (installed 1947) 250 lb.
United Ash Blower
Combustion Engineering Stoker, Steam

COATING ROOM
1—Waldron Brush Grounder Machine 37" max. width
1—B. F. Sturtevant Co. Steam Dryer with G.E. 30 HP 440 volt, 860 RPM motor
1—Exhaust fan with 3 HP Crocker-Wheeler 440 volt, 60 cycle 1750 RPM motor
1—Yale ½ ton spur-geared Chain Block
1—Lewis-Shepard 4000# Jack Lift Truck, "Master Line," No. 117292, HPI-40
3—Coating Mixing Tanks
1—Cooking Tank, steam jacketed

The Thomas Phillips Company

0-28

23 W. Exchange Street — Akron 8, Ohio — Phone FR 6-2181

University of Maine Lectures on Pulp and Paper Manufacture

SERIES NO. 2 A Valuable Textbook for the Paper Industry

Embracing the Complete Lectures as given at the University of Maine.

Three hundred and seventy-three pages and an additional 4-page colored insert of up-to-date material covering a broad field in both pulp and paper making and including many fine illustrations and diagrams.

For students expecting to enter the industry who wish to increase their knowledge and improve their positions, this textbook offers a complete education in pulp and paper manufacture.

For executives, superintendents, chemists, engineers and others whose knowledge of the industry is more comprehensive, this textbook will be invaluable as a reference for providing figures, process details, etc.

Bound in Cloth—Gold Lettering $5.00 per Copy Postage Prepaid

Published by **LOCKWOOD TRADE JOURNAL CO., Inc.**

49 WEST 45th STREET NEW YORK 36, N. Y.

FOR SALE ONE CYLINDER PAPER MACHINE

Including 104 Dryers (36" dia. x 84" face), complete with necessary drives. Wet End consists of one cylinder, 48" dia. x 90" face.* (also includes Suction Press Roll with all necessary vacuum pumps). 3 press sections, 2 calender stacks, 2 drum reel (will make 72" dia. rolls). Self conditioners, Cameron Winder, etc.

Machine will be in operation for another 3 months and could be inspected in operation.

Will sell any part of this machine.

**** Could also supply 6 cyl. stainless steel wet end and press section, to make 7 cyl. machine out of this one cylinder machine.***

J. J. ROSS COMPANY 377 Frelinghuysen Ave., Newark, N.J.—Tel. Bigelow 3-3720

0-21

INDEX TO ADVERTISERS

PAPER TRADE JOURNAL

A

Abbey Paper Stock Co. .... —
Acme Steel Company .... —
Adell Chemical Co. .... —
Albany Felt Co. .... —
Allegheny Instrument .... —
Allegany Ludlum Steel Corp. .. —
Allis-Chalmers Mfg. Co. .... 6 & 7
Aluminum Co. of America .... —
Aluminium Ltd. Sales, Inc. .... —
American Bitumuls & Asphalt Co. .... —
American Cyanamid Co., Dyes Dept. .... —
American Cyanamid Co., Paper Chemicals Dept. .... —
American Cyanamid Co., Pigments Dept. .... —
American Industrial Clays .... —
American Potash & Chem. Corp. —
American S. F. Products .... —
American Steel & Wire Co. .... —
Ames Company .... —
Annin Co. .... —
Antara Chemicals, Sales Div. Gen. Aniline & Film Corp... —
Apmew, Inc. .... —
Appleton Machine Co., The Fac. —
Appleton Wire Works .... —
Appleton Wood Products Co. .. —
Armco Drainage & Metal Products .... —
Armco Steel Corp. .... —
Armstrong Machine Works .... —
Asten-Hill Mfg. Co. .... —

B

Babcock & Wilcox Co. .... —
Bahr Bros. Mfg. Co. .... —
Bailey Meter Co. .... —
Baltimore & Ohio R. R. .... —
Bauer Bros. Co. 4
Becco Chemical Div. Food Machy. & Chem. Corp. —
Beloit Iron Works Co. .Bet. 42 & 43
Bird Machine Co. 21
Bixby, R. W., Inc. 66
Black-Clawson Co. 16
Blaw-Knox Company .... —
Boler Petroleum Co. .... —
Bolton & Sons, Inc. 61
Borden Co. .... —
Bowshet Co., N. P. .... —
Brandon Sales, Inc. .... —
Bristol Company .... —
Brown Co. .... —
Brown & Root, Inc. .... —
Buckeye Cellulose Corp. .... —
Buell Engineering Co. .... —
Buffalo Forge Co. .... —
Buffalo Pumps, Inc. .... —

C

Cady, E. J., & Co. 58
Cambridge Instrument Co. .... —
Cameron Machine Co. .... —
Carthage Machine Co. .... —
Cascade Mfg. Co. .... —
Central National Corp. ..Front Cover
Ciba Company .... —
Cities Service Oil Co. .... —
Clark-Aiken Company .... —
Classified Advertising 64
Clearing House 64
Coe Manufacturing Co. .... —
Columbia Cellulose .... —
Columbia-Geneva Steel Div., U. S. Steel Corp .... —
Columbia-Southern Chem. Corp. Sub. of Pittsburgh Plate Glass Co. .... —
Combustion Engrg. Co. .... —
Corn Products Sales Co. .... —
Crane Co. 8
Crucible Steel Corp. of America —
Curtiss-Wright Corp. .... —

D

Davis, Frank H., Co. 67
Day, J. H., Company .... —
DeZurik Shower Co. .... —
Diamond Alkali Co. .... —
Dicalite Div., Great Lakes Carbon Corp. .... —
Dierks Paper Co. .... —
Dilts Machine Works 16
Dodge Mfg. Co. .... —
Door-Oliver .... —
Dow Chemical Co. 49
Dow Corning Corp. .... —
Dowell, Inc. 2
Draper Bros. Co. 32
Dryden Paper Co., Ltd. .... —
du Pont, E. I., de Nemours & Co., Dyestuffs Dept. .... —
du Pont, E. I., de Nemours & Co., Electrochemical Dept. .... —
du Pont, E. I., de Nemours & Co., Pigments Dept. 55

E

East Texas Pulp & Paper Co. .. —
Eaton Manufacturing Co. .... —
Ebasco Services, Inc. 62
Egan, Frank W., & Co. .... —
Eichleay Corp. .... —
Electric Eye & Equipt. Co. .... —
Elixman Paper Core Co. .... —
Elliot Company .... —
Elwell Parker Elec. Co. .... —
English China Clays Sales Corp. —
Extremultus, Inc. 58

F

Fairbanks, Morse & Co. 11
Falk Corporation .... —
Farrel-Birmingham Co., Inc. .. 12
Fitchburg Screen Plate Co. .. —
Fluor Products Corp. .... —
Foxboro Co. .... —
Frederick Iron & Steel Co. .... —

G

Gates Rubber Company .... —
Garlock Packing Co. .... —
Geigy Dyestuffs Div., Geigy Chemicals Corp. .... —
General Dyestuffs Co. .... —
General Electric Co. .... —
Gibbs-Brower Co. .... —
Gilbert & Nash Co. .... —
Glidden Company .....Facing 10
Goodrich Chemical Co. 3
Goodrich Industrial Products Co. —
Goodyear Tire & Rubber Co. .. —
Gottesman & Co. .....Front Cover
Graver Tank & Mfg. Co. .... —
Grinnell Co., The 51
Gulf Oil Corporation .... —
Gulf States Paper Corp. .... —
Gurley, W. & L. E. .... —

H

Hagan Chemicals & Controls Corp. .... —
Hall, Thomas W., Inc. 68
Hamblet Machine Co. .... —
Harbison-Walker Refractories .. —
Hendrick Mfg. Co. 63
Hercules Powder Co. ..Back Cover
Homestead Valve Mfg. Co. .... —
Hooker Electrochemical Co. .. 15
Huber, J. M., Corp. .... —
Hudson Sharp Machine Co. .... —
Hungerford & Terry, Inc. .... —
Huyck, F. C., & Sons ..Facing 34

I

Improved Machinery, Inc. .... —
Infilco, Inc. .... —
International Wire Works .... —

J

Jefferson Chem. Co. .... —
Jenkins Brothers .... —
Jenkins, M. W., Inc. 63
Johns-Manville Corp. .... —
Johnson Corp., The 62
Johnson, Alvin H., & Co. .... —
Jones, E. D., & Sons Co. 54

K

Kalamazoo Tank & Silo Co. .... —
Kidder Press Co. .... —
Knox Woolen Co. .... —
Koppers Company .... —

L

Langston, Samuel M., Co. .... —
Link-Belt Co. .... —
Lobdell United Co. .... —
Lockport Felt Co. .... —
Lookwood Greene 60
Lodding Engineering .....Facing 11
Lukens Steel Co. .... —
Lummus Company 60
Lummus Cotton Gin Co. 4
Lunkenheimer Co. 71
Lyddon & Co. .... —

M

Magnus Metal Co. 62
Magnaflux Corp. .... —
Magnuson Products Corp. .... —
Main, Charles T., Inc. 60
Manchester Machine Co. .... —
Marathon Elec. Motor Corp. .... —
Mead Pulp Sales, Inc. .... —
Merrick Scale Co. .... —
Metallizing Engrg. Co. .... —
Minerals & Chemicals Corp. .. —
Minneapolis-Honeywell Reg. Co. —
Monsanto Chemical Co. Plastics Div. .... —
Montague Machine .... —
Moore & White Co. .... —
Morden Machines Co. .... —
Murray, D. J., Mfg. Co. .... —

N

Nash Engineering Co. .... —
National Aluminate Co. .... —
National Starch Products, Inc. 33
National Tube Div., U. S. Steel Corp. .... —
Nelson Company .... —
New Jersey Zinc Co. .... —
Nopco Chemical Co. .... —
Northeastern Paper Sales, Inc. —
Norton Co. .... —

O

Oakite Products, Inc. .... —
Ohio Injector Co. .... —
Olin Mathieson Chem. Corp. .. —
Osborne Paper Mill Equipt. Corp. .... —

P

Paper Converting Machine Co. 50
Parsons & Whittemore .... —
Patterson Fd. & Mch. Co. .... —
Patton Mfg. Co. .... —
Penick & Ford, Ltd. .... —
Perkins, B. F., & Sons, Inc. .. —
Perkins Goodwin Co. .... —
Personnel Service Associates .. —
Phillips Co., Thomas 69
Pioneer Paper Stock Co. .... —
Pittsburgh Piping & Equip. 10
Poirer Control Co. 48
Potdevin Machine Co. .... —
Powell Valves .... —
Price & Pierce, Ltd. 63
Pusey & Jones Corp. .... —

R

Railway Supply & Mfg. Co. .. —
Raymond, Chas. P., Service, Inc. 64
Rayonier, Inc. .... —
Read Standard Corp. .... —
Ready-Power Co. .... —
Record Fdy. & Mch. Co. .... —
Reliance Elec. & Engrg. Co. .... —
Rem-Cru Titanium Inc. .... —
Restigouche Corp. .... —
Rice Barton Corp. .... —
Riedel, Gus & Son .... —
Riegel Paper Corp. .... —
Rogers, Sam'l. C., & Co. .... —
Rohm & Haas Co. 9
Ronningen-Petter Co. .... —
Roosevelt Paper Co. ....Front Cover
Ross, J. J., Co. .....65 & 69
Ross-Midwest Fulton Co. .... —
Ross Paper Machinery Co. ..64 to 68
Roy, Milton Co. .... —
Ruderman Machy. Exchange .. 66
Rust Engineering Co. .... —

S

Sandoz Chemical Works ..Facing 50
Sandwell & Co. .... —
Sandy Hill Iron & Brass Works 14
Saran Lined Pipe Co. 49
Scapa Dryers, Inc. .... —
Seaboard Air Line R. R. Co. .. —
Shartle Bros. Machine Co. 16
Sheffield Corp. 62
Shell Chemical Corp. .... —
Shuler & Benninghofen .... —
Sigmamotor Inc. .... —
Signode Steel Strapping Co. Facing 35
Sirrine, J. E., Co. 68
Smidth, F. L., & Co. .... —
Socony, Mobiloil .... —
Soderhamn Mch. Mfg. Co. .... —
Sonoco Products Co. .... —
Southworth Machine Co. .... —
Spraying Systems Co. .... —
Stadler Hurter & Co. 60
Statement of Ownership .... —
Stelcon Ind. Floors .... —
Stebbins Engrg. Co. .... —
Stein, Hall & Co. .... —
Stevens, Charles R., Inc. .... —
Stone & Webster Engrg. Corp. 61
Stowe-Woodward, Inc. .... —
St. Regis Paper Co. .... —
Sturtevant Div., Westinghouse Elec. Corp. .... —
Sunday, Geo. M., Assoc. 64
Sutherland Refiner Co. .... —
Swenson Evaporator Co. .... —
Swepco Tube Corp. .... —

T

Taylor Instrument Co.'s ...56 & 57
Taylor Stiles & Co. .... —
Tennessee Coal & Iron Co. .... —
Tennessee Corp. .... —
Testing Machines .... —
Texas Co. .... —
Texas Gulf Sulphur Co. .... —
Thiele Kaolin Co. .... —
Thomas Paper Stock Co. 63
Timken Roller Bearing Co. .... —
Titanium Pigment Corp. 53
Torrington Co. .... —
Towmotor Corp. 52
Tracerlab Inc. .... —
Trent Tube Co. .... —
Tyer Rubber Co. .... —

U

United Carbon Co., Inc. .... —
United Engrg. & Fdy. Co. .... —
United Paper Machinery Corp. .. —
U. S. Industrial Chem. Co., Div. of National Distillers & Chem. Corp. .... —
U. S. Rubber Company .... —
United States Steel Export Co. —
United States Steel Supply Co. —
U. S. Steel Corp. .... —

V

Valley Mfg. Co. .... —
Valley Iron Works 31
Vanderbilt, R. T., Co. .... —
Viking Instruments, Inc. .... —
Virginia Smelting Co. .... —

W

Waldron, John, Corp. .... —
Wallace & Tiernan Inc. 59
Walworth Co. .... —
Weber, H. G., & Co. .... —
West End Chemical Div., Stauffer Chem. Div. .... —
Westinghouse Elec. Corp. ..40 & 41
West Virginia Pulp & Paper Co. —
Weyerhaeuser Timber Co. 61
Whiting Corp. .... —
Wiggins Teape & Alex Pirie.. —
Williams-Gray Co. .... —
Wisconsin Wire Works .... —
Woodpulp, Inc. .... —
Worthington Corp. .... —
Wyandotte Chem. Corp. .... —
Wyatt Metal & Boiler Works . —

Y

Yale & Towne Mfg. Co. .... —
Yarnall-Waring Co. .... —

While we strive for accuracy in preparing the above index which is purely a service to our readers, we cannot be responsible for errors.

BUSINESS STAFF

Arthur E. Gordon, Business Mgr.
Francis J. Gordon
49 West 45th Street, New York 36, N. Y. Plaza 7-2370
H. K. Vinton
CHICAGO 3, ILL.: Room 1020, 79 West Monroe St. CEntral 6-2784

Frederick B. Grosse Production Mgr.
Alrick Man
49 West 45th Street, New York 36, N. Y. Plaza 7-2370
H. L. Poulton
PITTSBURGH, 11, PA.: 610 Pennridge Road. Hemlock 1-1571

McDonald-Thompson Company
SAN FRANCISCO, CAL.: 625 Market St. YUkon 6-0647
LOS ANGELES, 5, CAL.: 3727 West Sixth Street. DUnkirk 7-5391
DENVER, 2, COLO.: 222 Colorado Nat'l Bank Bldg. KEystone 4-4669
SEATTLE, 4, WASH.: National Bldg.—ELliott 3767
HOUSTON, 6, TEXAS: Room 214, 3217 Montrose Blvd. JAckson 9-6711
TULSA 4, OKLAHOMA: 2010 So. Utica
MIAMI, FLORIDA: Hal Moore, Printup & Assoc., 1006 Langford Bldg. Phone:—FRanklin 9-2668. Georg J. Linder: Frankfurt am Main, Wittlesbacher Alle 60, Germany — Telefon 46372

HUGHES PRINTING CO.
EAST STROUDSBURG PA.

Lighter! Tighter!

LUNCOR PVC *VALVES*

Defy Corrosion!

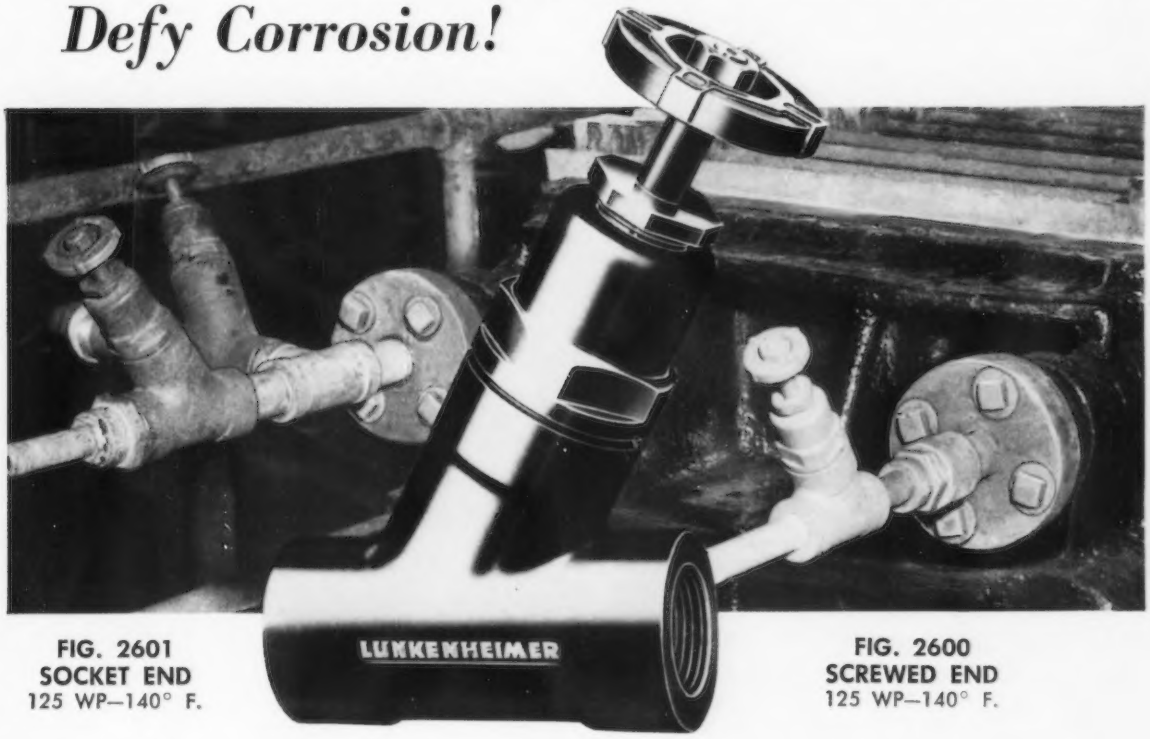


FIG. 2601
SOCKET END
125 WP—140° F.

FIG. 2600
SCREWED END
125 WP—140° F.

Replace expensive high-alloy or glass-lined valves in your corrosive services with these money-saving, high-performance valves. Luncor is the first all-molded PVC valve designed and engineered by a valve manufacturer . . . and its low-cost performance is proved in handling most common corrosive solutions. Luncor Valves weigh only half as much as aluminum—one-sixth as much as bronze. Yet their high strength-weight ratio gives them rigidity comparable to metal. Luncor Valves are available in one-half inch through two inch sizes.

To list only a few . . . Luncor PVC Valves have established outstanding records for economy and service in the following operations:

- PAPER MILLS
- CHEMICAL PLANTS
- FOOD PROCESSING
- BEVERAGE BOTTLING
- PETROLEUM REFINING
- SUGAR REFINING
- WATER TREATMENT
- MARINE INSTALLATIONS

For detailed service recommendations . . . request a *Confidential Corrosion Service Information Form* from your Lunkenheimer Distributor, or from The Lunkenheimer Company, Box 360, Cincinnati 14, Ohio.

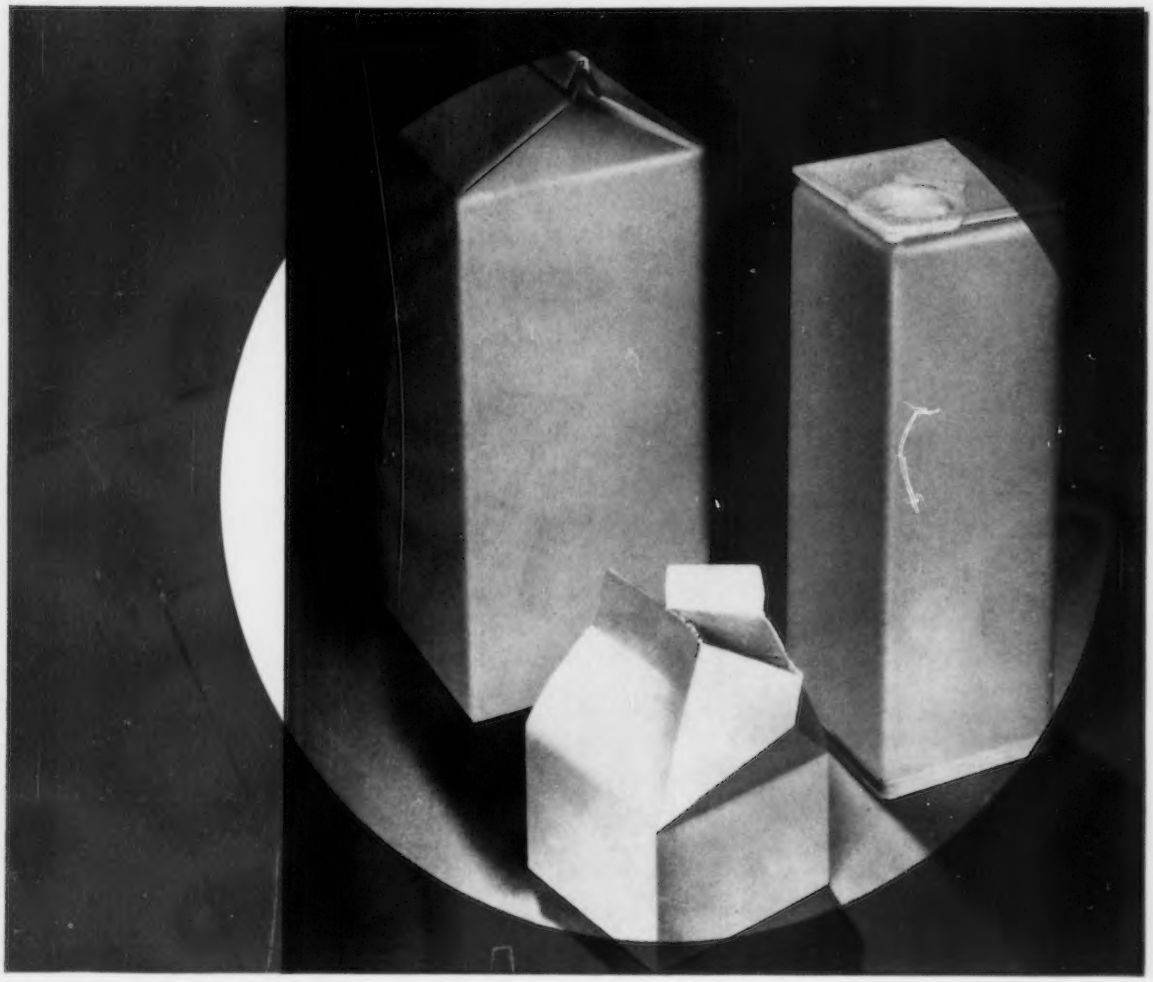
BRONZE • IRON • STEEL • PVC

L-807-9

LUNKENHEIMER QUALITY

LUNKENHEIMER®

THE ONE *Great* NAME IN VALVES



CMC ON SOLID FIBERBOARD FOR BETTER WAX HOLDOUT

CMC applied at the size press or calendar provides higher and more uniform densometer for better wax holdout. Densometer can be controlled to meet desired customer specification. Result: More uniform waxing, lower wax consumption, less mottle, less pin-holing.

CMC for the production of improved solid fiberboard is readily available from Hercules' strategically located facilities. For technical service, or for additional information on Hercules® CMC and its applications in the paperboard industry, write:

HERCULES cmc

Virginia Cellulose Department

HERCULES POWDER COMPANY

INCORPORATED

900 Market Street, Wilmington 99, Delaware

VP57-2